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HOARE (Cecil A.). **On Protozoal Blood Parasites collected in Uganda. With an Account of the Life Cycle of the Crocodile Haemogregarine.** —*Parasitology*. 1932. June. Vol. 24. No. 2. pp. 210–224. With 56 figs. [17 refs.]

When he was attached to the Human Trypanosomiasis Institute at Entebbe the author availed himself of every opportunity of examining the local fauna for parasitic protozoa. In this paper are to be found among other things descriptions of 7 new species of such protozoa, and a record of new hosts for a number of known species with new observations on some of them ; the descriptions are bountifully illustrated (56 figures) in the text and there is a good list of references. The new species include a Plasmodium in the blood of Mabuia (skink) lizards, and one in a wheatear (Saxicola) ; a Trypanosoma in the blood of several species of fishes of the genus Haplochromis ; a Haemogregarina in the blood of a frog of the genus Hyperolius, another in that of a Simocephalus snake, another in that of a Boaedon snake, and another in that of a Crotaphopeltis snake. Among the new observations on species of protozoa already recorded those on the life cycle of *Hepatozoon pettiti* in the Nile crocodile (*C. niloticus*) may be noticed, as the first instance where a dipterous insect (*Glossina palpalis*) has been proved the intermediate host of a haemogregarine. In the author's experience every crocodile examined in L. Victoria (from the young a month old to full-grown adults) was infected with *H. pettiti*, although the parasites always were scanty in the blood. The schizogony occurred exclusively in the crocodile's liver, the initial stages in erythrocytes , the final stages in Kupffer cells ; the full-formed merozoites are quite similar to slender forms seen in the reptile's liver. The sporogony takes place in the gut of the tsetsefly and results in the formation of large spherical oocysts, each one being stuffed with many (over 100 estimated) sporocysts each of which contains a multitude of sporozoites. The crocodile is infected *per os* ; when the tsetsefly settles in its mouth to feed, the irritated reptile would snap its teeth, crush the fly, and so set free the cysts of the haemogregarine in its mouth. The facts about sporogony had been observed by previous observers (CHATTON and ROUBAUD ; MACFIE) but it is the present author who has established the Nile crocodile as the final host of the haemogregarine in Lake Victoria and *Glossina palpalis* as the intermediary. The haemogregarine, as the author notes, is known chiefly as parasite of leucocytes

and erythrocytes of mammals ; he himself has followed it into birds also, and now into reptiles and through the intermediation of *G. palpalis.* *A. Alcock.*

POINDEXTER (Hildrus A.). **Studies on the Cultivation of Parasitic Intestinal Protozoa.**—*Porto Rico Jl. of Public Health & Trop. Med.* 1932. June. Vol. 7. No. 4. pp. 417–434. [72 refs.]

This is a retrospect, and an abstract of the literature, on the cultivation of intestinal amoebae and intestinal flagellates, with an appended bibliography thereto. The author's own studies in the cultivation of *E. histolytica* and of some intestinal flagellates are described in much detail, along well-beaten tracks. *A. A.*

CHOPRA (R. N.) & CHOWHAN (J. S.). **Action of Venom of the Indian Daboia** (*Vipera russellii* **vel** *Vipera elegans*) **on Certain Protozoa.**—*Indian Jl. Med. Res.* 1932. July. Vol. 20. No. 1. pp. 107–115.

In an earlier paper the authors showed that the venom of the Indian cobra had a strongly toxic effect on certain Protozoa, particularly on *Paramoecium caudatum* ; soon after exposure to that venom the movements of the Ciliate were slowed and then completely paralyzed, and thereafter its body swelled and disintegrated ; even in a dilution of 1 in 30,000 cobra venom thus killed the organism in 1 to 2 hours.

In comparison with Indian cobra venom the venom of Russell's viper has little or no effect on Paramoecium. The organisms were not affected by concentrations of that venom ranging from 1 in 100 to 1 in 100,000 ; the only change noticed was a dulling of their motility ; they sank to the bottom or were driven to the periphery of the glass cell ; they were not paralyzed, and they did not die even after 24 to 48 hours' exposure to the venom. Change in hydrogen-ion concentration of the substrate on the alkaline side makes the Paramoecium more vulnerable to Russell's viper venom, 1 in 400 concentration killing in 1 to 2 hours and 1 in 800 in 24 hours ; but change on the acid side has no effect on the toxicity to this Ciliate.

The authors argue that " the action of cobra venom is more on the rudimentary neuro-motor apparatus which has been described in this organism " and that Russell's viper venom, which has a selective action on the vascular endothelial cells, can have little or no effect on a unicellular organism not possessing a vascular system.

In their experiments in other directions they found that Russell's viper venom had no effect on the helminths *Toxocara canis* and *Ancylostoma caninum* in concentrations of 1 in 1,000 and less, while in higher concentrations from 1 in 100 to 1 in 1,000 the worms appeared active at first but later were slowed and appeared to become stiff ; but they did not die even after exposure for 24 hours. *A. A.*

SCHILLING (Claus) & SCHRECK (Hans). Bleiben erworbene biologische Eigenschaften pathogener Protozoen bei der Passage durch die natürlichen Ueberträger erhalten ? [**Are Acquired Biological Properties of Pathogenic Protozoa retained in Passage through their Natural Vectors ?**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Mar. Vol. 36. No. 3. pp. 105–107.

This is a notice of criticism published by REICHENOW in the *Zentralblatt für die Gesamte Hygiene*, 1931, Vol. 25, P. 170 of the present

authors' paper (same title) which was abstracted in this *Bulletin*, Vol. 28. p. 484. In that paper these authors clearly described facts, experimentally elicited in the chosen isolation of a small coral island, from which they infer, by a sound logical method, that the virulence and reactivity to specific anti-bodies " acquired " (as they say) by an old laboratory-strain of a specific trypanosome are lost by passage through the natural insect-intermediary. [There is nothing unreasonable in this argument ; Zoologists know that many characters commonly but *wrongly* classed with and called " acquired " characters are *not* hereditarily transmitted when the organism is returned to its natural environment. Where criticism of the authors lies perhaps is in their styling laboratory-enforced modifications as being " acquired "]. *A. A.*

TSUCHIYA (H.). **Observations on " Encystment Cycle " of** *Endamoeba histolytica* **in a Carrier.**—*Proc. Soc. Experim. Biol. & Med.* 1932. May. Vol. 29. No. 8. pp. 930–932.

In stools of a carrier of *E. histolytica* studied daily for 215 days a definite cycle of encystment was observed, the duration of the cycle being from 8 to 10 days. The number of cysts fluctuated from day to day, with a maximum of about 1,250,000 per gram of stool. Under favouring conditions of temperature and moisture cysts may mature *in vitro*—*e.g.*, uni- and binuclear cysts develop to maturity quite readily *in vitro* at room temperature (22°C.) and in a refrigerator at 5°C. In a refrigerator washed cysts lived for 28 to 35 days and cysts in stool 9 to 11 days ; but at room temperature the corresponding viabilities were 7 to 9 days and 3 to 6 days. No correlation was observed between consistency of stools and number of cysts. *A. A.*

MARCHOUX (E.) & CHORINE (V.). La fécondation des gamètes d'hématozoaires. [**The Fertilization of Gametes of Haematozoa.**]—*Ann. Inst. Pasteur.* 1932. July. Vol. 49. No. 1. pp. 75–102. With 2 figs. [23 refs.]

The authors recount the chronological and the natural history of Haemoproteus (=Halteridium) as an introduction to this experimental disquisition based on fertilization of the gametes of *H. oryzivorae* ; and they tabulate the following conclusions from their experiments. The fertilization of *H. oryzivorae* is consummated at 13° to 43°, the optimum temperature being 36°. The oocinetes are formed at 20°–23° ; they degenerate at 37°. Neither concentration of the liquid nor cooling provoke fertilization. Addition of NaCl in either very feeble or very strong solution is a preventive agent, though a 1 per cent. solution has no effect. Potassium oxalate and sodium citrate in physiological saline permit fertilization in non-coagulated blood.

It is the CO^2 of the blood which is the restraining agent, fertilization starts when the CO^2 is disengaged, provided that the action of that gas has not been too prolonged. The disengagement of CO^2 brings the pH of the blood from 7·38 to 7·75 in 5 minutes. The CO^2 only acts by maintaining a low pH of the blood ; other acids have the same effect, but the injection of alkaline solutions modifies the pH of the blood but little. Fertilization is effected in the relative absence of oxygen, and in an atmosphere of hydrogen.

Hydrochloride of quinine arrests fertilization in solutions of 1 in 10,000 and almost entirely interdicts it in solutions of 1 in 1,000. Plasmoquine and 710 Fourneau also arrest in solutions of 1 in 10,000, and interdict in solutions of 1 in 4,000. *A. A.*

GINGRICH (Wendell). **Immunity to Superinfection and Cross-Immunity in Malarial Infections of Birds.**—*Jl. Preventive Med.* 1932. May. Vol. 6. No. 3. pp. 197–246. [34 refs.]

This is a comparative study of the acquired immunity and cross-immunity to eight strains (4 species) of malaria infection in birds (canaries). The experiments cannot be summarized; their results support and supplement the propositions that the immunity to superinfection runs concurrent with a latent or chronic infection and ceases when the infection is completely eliminated; that no demonstrable humoral antibody is associated with this acquired immunity; but that the manner of immunity to superinfection is primarily increased phagocytosis of parasitized red cells by proliferation and increased activity of macrophages, chiefly in the spleen and liver. *A. A.*

SIMIĆ (Tsh.). Etude biologique et expérimentale du *Trichomonas intestinalis,* infectant spontanément l'homme, le chat et le chien.—[**Biological and Experimental Study of** *Trichomonas intestinalis* **Spontaneously infecting Man, Cat and Dog.**]—*Ann. Parasit. Humaine et Comparée.* 1932. May 1. Vol. 10. No. 3. pp. 209–224. [10 refs.]

Of Trichomonas (*a*) four out of five strains of human origin have infected the cat and have been pathogenous to the animal; and (*b*) four strains of feline origin have infected the dog; in both kinds of animals infection was set up by rectal injection, by ingestion in milk, and by contact; furthermore, four out of six persons were infected by ingestion of Trichomonas of feline origin and two out of three persons by ingestion of Trichomonas of canine origin. On these data the author decides that it is one species that infests man, dog, and cat.

All the strains of Trichomonas—human, canine, and feline—phagocyted red blood corpuscles and starch; all withstood for an hour a temperature of—18°, and for 10 minutes a temperature of +47°. The longevity of different strains of Trichomonas in water ranges from 18 to 35 hours. At Skoplie (S. Yugoslavia) more than 7 per cent. of the population is infected with Trichomonas and more than 30 per cent. of the young dogs. Indeed the dog may be the reservoir of human infection. *A. A.*

SIMIĆ (Tsh.). Etude complémentaire de l'infection du chien par le *Trichomonas* d'origine humaine, canine et féline. [**Infection of Dog by Trichomonas of Human, Canine and Feline Origin.**]—*Ann. Parasit. Humaine et Comparée.* 1932. Sept. 1. Vol. 10. No. 5. pp. 402–406.

The author repeats his experimental conclusion that the cat, and even more the dog, can be infected with Trichomonas of human origin, and conversely that man can easily be infected with the Trichomonas of those animals. In the present paper, however, he records that of dogs it is only the young that can be so infected; in very young puppies the infection is intense, enduring, and fatal; in dogs of 2 and 3 months it is intense but can be cured in 25–45 days; it appears that adult dogs resist infection, whatsoever its source. *A. A.*

LYNCH (Kenneth M.). **Invasion of the Wall of the Intestine by** *Trichomonas hominis.*—*Amer. Jl. Trop. Med.* 1932. May. Vol. 12. No. 3. pp. 247–253. With 1 fig.

The patient in this case was a white woman of 47 years. On the second day after some operations (including cauterization of cervix uteri, extraction of bad teeth, and removal of some external haemorrhoids) she suddenly developed acute abdominal symptoms, violent diarrhoea with purulent stools (found to contain enormous numbers of *Trichomonas hominis* in active multiplication), and a septic fever which ended in death after 12 days. Immediately after death an autopsy was made and a gangrenous ruptured transverse colon was removed and placed in 10 per cent. formalin. Sections of a piece of this showed the mucosa necrotic and ulcerated and infiltrated with *T. hominis*, particularly in the depth of the necrotic pockets which extended into the "living" muscular coat, but not where active leucocytosis existed. "Of course, in such a case as this, of virtual gangrene of the intestine, the entrance of Trichomonas into the wall of the bowel would probably be of no significance in the course of events." WENYON's case is quoted (*Jl. Trop. Med & Hyg.* 1920. Vol. 23. p. 125), in which also there was not any noticeable lesion that could be attributed to an invasion of Trichomonas; also a case by PENTIMALLI of Trichomonas in the circulating blood, and one by KESSEL of Trichomonas in the pus of amoebic liver-abscess. *A. A.*

PENSO (Giuseppe). Le cisti del "Trichomonas intestinalis." [**Cysts of** *Trichomonas intestinalis.*]—*Ann. di Med. Nav. e Colon.* 1932. May-June. 38th Year. Vol. 1. No. 5–6. pp. 275–278. With 2 figs.

The author describes certain bodies which he observed in the faeces of a patient with large numbers of *T. intestinalis*, 10–12 in each field of the oil immersion lens. No other parasites were seen. The bodies were pear-shaped, in size 8–12μ by 4–5μ, with granular protoplasm, and a kidney-shaped nucleus with masses of chromatin, occupying the middle and wider part, and towards the narrower end the blepharoplast, with a flagellum bounding an undulating membrane. Running parallel to the flagellum was a thin structure which the author interprets as the remains of the axostyle; the whole he believes to be the cyst of *T. intestinalis* which has not previously been described.

H. H. S.

LIDDO (Salvatore). Osservazioni sulla resistenza nell' ambiente delle cisti di lamblia umana. [**The Resistance of Lamblia Cysts under Atmospheric Conditions.**]—*Pathologica.* 1932. Sept. 15. Vol. 24. No. 491. pp. 614–615. English summary (9 lines).

The author studied the time of survival of cysts of *Giardia lamblia* when subjected to the temperature and general conditions of his laboratory, stools containing the cysts being kept in a corner of the room, protected from direct light and at a temperature of 14°–18°C. At intervals he took samples from the surface and from the depth, determining by rough count the reduction in numbers, the presence of glycogen in them (as a criterion of vitality) and their decystment.

During the first 10 days he obtained the glycogen reaction, but the numbers were reduced 50–70 per cent. in 20 days, and 90–95 per cent.

in 40–50 days. The majority of the cysts examined, even when showing no morphological change, did not give the glycogen reaction and were, therefore, probably not viable or capable of setting up infection. Others were swollen, with non-granular protoplasm and obviously dead. Within the first 10 days he observed decystment *in vitro* in exceptional instances, and in horse serum at 37°C. Their infectivity is, consequently, probably limited to the ten days after passage.

H. H. S.

LICKINT (Fritz). Die Lambliasis, eine Bergrevierkrankheit? [**Lambliasis, a Disease of Mining Districts?**]—*Muench. Med. Woch.* 1932. June 17. Vol. 79. No. 25. pp. 993–994.

The author writing from a Department of the State Hospitals in Kuchwald-Chemnitz, states that it is difficult now to say anything new about lambliasis as a disease. Considering it, however, from the point of its incidence, he states generally that in many, including even large, clinics in Germany its clinical picture is altogether unknown. Considering it in respect of its provenance in Saxony, he states that in Chemnitz, Nittau, Dresden, Plauen, Leisnig and Glauchau no cases—or, as in Leipzig only quite isolated cases—come under clinical observation. He finds however that it is relatively prevalent in coal mining districts. *A. A.*

BALL (Gordon H.). **Attempts to produce Encystment in Chilomastix.**—*Proc. Soc. Experim. Biol. & Med.* 1931. Vol. 28. pp. 696–697.

——. **Observations on the Life History of Chilomastix.**—*Amer. Jl. Hyg.* 1932. July. Vol. 16. No. 1. pp. 85–96. [16 refs.]

In a series of experiments continued for several years and employing cultivation of *Chilomastix mesnili* in a number of standard culture media there was no evidence of anything approaching a life-cycle and no cysts were ever found. The standard culture media were modified in various ways—increased viscosity, increased concentration of substances normally present in faeces, addition of sterile rice starch or rice flour, cultivation on N.N.N. medium, alteration of temperature, alteration of pH concentration—but none of these modifications produced encystment. But HEGNER's results in transmission of Chilomastix and other mammalian protozoa to young chicks have been amply confirmed, the caecum of the chick forms a particularly favourable environment for Chilomastix and encystment occasionally occurs there. *A. A.*

BLACKLOCK (D. B.). **Parasitology in the Medical Curriculum.**—*Brit. Med. Jl.* 1932. June 18. pp. 1138–1139.

This is a very sound and rational argument for the inclusion in the ordinary medical curriculum of some definite instruction in animal parasitology—not as a special subject for a particularly marked place in the professional examinations, but as a sort of leaven or vitamin penetrating and impregnating the pabulum of zoology. The author briefly and orderly reviews the animal parasites hurtful to mankind and indicates the large generality as well as the inherent properties of their importance. [The author's proposal would also help to open the students' eyes to the fact—which in the reviewer's student days had been almost forgotten—that biology is very far from being a despicable impediment in the road to professional erudition.] *A. A.*

HERMS (W. B.). **Insect Parasitology.**—*Jl. Econom. Entom.* 1932. Apr. Vol. 25. No. 2. pp. 222–232.

A dissertation on familiar lines of a generally educative tone. A noteworthy matter is the statement [which leaves British withers unwrung] that, as curricula are now set, the student of insect parasitology "cannot secure adequate training through the channels of entomology alone." As the author rightly enough contends, "to become a parasitologist the student should be first of all a fundamentally well trained biologist"—which nobody can deny. *A. A.*

CLELAND (J. Burton). **Injuries and Diseases in Australia Attributable to Animals (other than Insects). Series IV.**—*Med. Jl. Australia.* 1932. Jan. 30. 19th Year. Vol. 1. No. 5. pp. 157–166. [60 refs.]

A docket that will be appreciated by such as collect material for seasoning a drowsy treatise on medical zoology. It is a collection of short discursive notes on assaults committed upon man, the paragon of animals, by the lower creation exclusive of insects and snakes. The notes have a varied range; in one case, relating to a seal that dragged a man out of a boat and bit him, we are told of a constable's nocturnal adventure with a seal when he went to arrest what was supposed to be a drunken man reclining in the gutter. The items of this interesting miscellany are included under the following headings:—

Weapons of savages. Bites and various other injuries from camel, pig, seal, dingo, fox, wild cat, kangaroo, duckmole; magpie, eagle, cassowary, laughing jackass; crocodile, various lizards; shark, stingray, the horrid Synanceia and other fishes; Isopod crustacea; rat-mites, food-mites, harvest-mites, Demodex, venomous spiders, scorpions, centipedes, millipedes, cuttlefish, giant clam, leech, spicules of seaworms and sea-urchins, nettles of sea-anemones and jellyfish; *Trichomonas vaginalis.* *A. A.*

ORTIZ DE LANDAZURI (Eduardo). Parasitismo intestinal en la zona del Protectorado de España en Marruecos. [**Intestinal Parasitism in the Spanish Zone of Morocco.**]—*Medicina Países Cálidos.* Madrid. 1932. May. Vol. 5. No. 3. pp. 211–217. [14 refs.]

This investigation was undertaken to determine whether ankylostomiasis existed or not in the Protectorate. The method employed was examination of fresh specimens direct and by the concentrated saline of Willis-Molloy. Patients, 110 in number and from the medical, surgical, dermatological and venereal divisions of the Military Hospital, Tetuán, and 75 apparently healthy individuals in the kabila of Beni-Busera (Buhamed) were examined. The following were the most important findings: Hymenolepis, Trichuris, Enterobius, Strongyloides and Giardia, alone or combined, but ankylostomes were not seen in a single instance. *H. H. S.*

HILL (Rolla B.) & NIÑO ASTUDILLO (Jesus). Los parasitos intestinales del hombre en Campo Lugar (Cáceres). [**Intestinal Parasites at Campo Lugar (Cáceres).**]—*Medicina Países Cálidos.* Madrid. 1932. July. Vol. 5. No. 4. pp. 261–268. [18 refs.] French summary (4 lines).

Campo Lugar is a rural district in the south of the Province of Cáceres, with a population of 1,200. Hygienically, the conditions of

life are not enviable. Only 10 of the houses and none of the schools have any latrine accommodation, excreta being deposited indiscriminately in the yards behind the dwellings, in the roads or fields.

The authors examined the faeces of 130 children to the age of 15 years. To their surprise only 29 were found to be harbouring helminths. Twenty-three were infested with *H. nana*, 5 with *Ascaris lumbricoides*, 2 with *Enterobius vermicularis* and one with *T. saginata*. Not a single instance of Trichuris, Ancylostoma or *T. solium* infestation was found. Protozoal infection was more common ; 92 had one or more parasites, the commonest being *Trichomonas hominis*, 34 cases, Chilomastix and Giardia each 32. Twenty-three showed a small ciliate provisionally diagnosed as *Balantidium minutum*.

Twenty of the children suffered from diarrhoea and 15 of these harboured flagellates, but the authors do not regard the latter as causing the former. Several children harboured more than one parasite, and one, 6 years of age, had ova of *H. nana* and *A. lumbricoides*, and cysts of *E. coli. G. lamblia*, Chilomastix and Iodamoeba, but was apparently in the best of health. No instance of *E. histolytica* infection was encountered. *H. H. S.*

TALAMONTI (Luigi). Reperto degli esami di feci eseguiti nell'Istituto di Patologia Coloniale di Modena dal 1° Agosto 1930 al 30 Giugno 1932. [**Faecal Examinations at the Modena Institute of Colonial Pathology.**]—*Arch. Ital. Sci. Med. Colon.* 1932. Aug. 1. Vol. 13. No. 8. pp. 487–498. English summary (3 lines).

The period covered was 23 months, August 1930–June 1932 inclusive. The number of examinations carried out was very small, only 502 in all, but of these 384 or 76 per cent. were positive. The most important and the more common parasites were protozoal, helminths, with the exception of *Trichuris trichiura* found 39 times, being remarkably few ; next in frequency being *Ascaris lumbricoides* 12, and *H. nana* 9. *E. histolytica* was present in 288 or 57 per cent., which is very high. ISOTTI in 1929–30 at the Laboratory of Tropical Pathology, Bologna, found it in 36·6 per cent. of 608 examinations, while BERTI reported only 1 per cent. among 760 miners on the Bologna-Florence line. Of the 288 recorded by the author, it was found alone in 130, and associated with others, notably flagellates and Blastocystis, in 158. The vegetative form was seen in 16, the precystic and cystic in 69, vegetative and cystic in 45. A table is given showing the different Provinces and districts from which the patients came ; more than half were from Bologna Province and 112 from Bologna itself. *E. coli* was found on 43 occasions, or 8·3 per cent. of the total ; in 37 of these it was associated with *E. histolytica*. Other frequent findings were *G. intestinalis* 84, *Trichomonas intestinalis* 28 and *Chilomastix mesnili* 29.

H. H. S.

DE CARVALHO (Jarbas). Dipteros hematophagos do municipio de Ponte Nova (Minas Geraes). [**Blood sucking Diptera in Ponte Nova (Minas Geraes).**]—*Brasil-Medico.* 1932. Aug. 20. Vol. 46. No. 34. p. 740.

In August 1931 the author started to collect insects from different parts of the municipality and he reports finding specimens of *Aëdes aegypti, Cellia argyrotarsis, Myzorrhynchella lutzi, Taeniorhynchus fasciolatus, Mansonia titillans, Cellia tarsimaculata* and *Dendromyia* sp. He met with no specimen of Phlebotomus. *H. H. S.*

MELLANBY (Kenneth). **The Influence of Atmospheric Humidity on the Thermal Death Point of a Number of Insects.**—Reprinted from *Jl. Experim. Biol.* 1932. Apr. Vol. 9. No. 2. pp. 222–231. With 5 text figs. [11 refs.]

This paper describes and figures a contrivance for exposing small insects (in this case rat-flea and larvae, body louse, blowfly, small mealworm larvae) to high temperatures in air of controlled humidity. In exposures to various temperatures and humidities for one hour the humidity had no effect upon the death point, except in the case of large mealworms, which died at 1°C. higher in dry air than in moist. In exposures for 24 hours in moist air all the species died between 36° and 39·5°C.; in dry air "those insects not able to conserve their water died at low temperatures." *A. A.*

IYENGAR (M. O. T.) & SARATHY (M. K. P.). **A Constant Humidity Apparatus for Mosquitoes.**—*Indian Jl. Med. Res.* 1932. Apr. Vol. 19. No. 4. pp. 1091–1114. With 2 text figs.

In experimenting on the effect of different humidity concentrations on living mosquitoes in a closed chamber, *at concentrations lower than saturation point*, the difficulty occurs of maintaining constant humidity conditions along with some exposed water for the welfare of the insects. The authors have devised, and here describe and figure, a constant humidity apparatus that meets the requirements. The experimental tests of the apparatus and the explanation of its control of humidity under conditions of varying temperature are too technical to be summarized to any purpose. *A. A.*

CAZANOVE (F.). Les moustiques à Dakar en 1931. [**Mosquitoes at Dakar in 1931.**]—*Bull. Soc. Path. Exot.* 1932. July 6. Vol. 25. No. 7. pp. 797–817.

Under the headings Stegomyia, Anopheles, Culex, and leaving specific distinctions unexpressed, the author deals with these insects at Dakar in 1931 from the point of view of the Sanitary Service, first emitting a sigh over the difficult task of that service in that year.

The number of haunts of Stegomyia destroyed in Dakar and the neighbouring villages in that year was 744. In the town itself the ordinary habitat of the larvae is the stored water jar of the native hut. The aim of the sanitary service is to abolish these jars and to install a supply of running water and organize a system of domiciliary visits. Besides the domestic water-jars the usual miscellany of domestic utensils that serve the insect as breeding-place near dwellings is described. The Stegomyia index is very much highest in September–October when the rainy season has provided the largest number of breeding-places outside those in and about dwellings and the insect is most active; this is the time too when natives from places in the bush where yellow fever may perhaps be endemic, flock to Dakar for employment, and perhaps may bring the infection with them.

The number of breeding-places of Anopheles destroyed was 106. At the same time material was collected for mapping the local species. But while the Sanitary Service strains to suppress Anopheles in the town of Dakar automobiles carry the inhabitants to places outside for the night, where they contract malaria, and also convey sportsmen into malarious country far from the town.

The number of breeding-places of Culex destroyed was 234, the months of most active destruction being August, September, and November. Among the shelters of Culex in the cold season are certain situations in drains and cesspools. Although all now attribute the transmission of dengue to Stegomyia the author states that he finds Culex behind all the cases (with one exception) of an articular fever without an eruption which he has entitled dengue. *A. A.*

HINMAN (E. Harold). **The Rôle of Solutes and Colloids in the Nutrition of Anopheline Larvae. Preliminary Report.**—*Amer. Jl. Trop. Med.* 1932. May. Vol. 12. No. 3. pp. 263–271.

A very technical paper dealing with attempts to estimate the value of water colloids and material in solution for the nutrition of Anopheline larvae in nature. The conclusion, for larvae of *Anopheles crucians* and *A. quadrimaculatus*, is that they can live for a time and make considerable growth under sterile conditions in Seitze-Werke filtered water from their breeding-pools, but cannot develop in the dialysate of water from the same breeding-pools. " Thus it would appear that the non-dialysable fraction of the water is of considerable importance in the nutrition of Anopheline larvae," and " that the dialysable elements alone are insufficient to support larval life." *A. A.*

HINMAN (E. Harold). **The Utilization of Water Colloids and Material in Solution by Aquatic Animals with Especial Reference to Mosquito Larvae.**—*Quarterly Rev. Biol.* 1932. June. Vol. 7. No. 2. pp. 210–217. [41 refs.]

A review of some of the literature on the question of the utilization by aquatic animals of water colloids and material in solution as food, beginning with PUTTER (1907–1922) who believed that marine animals could absorb liquid food not only by the intestinal tract but also through the skin (and gills in fishes), passing on to the critics who argued that the organic content in solution in seawater is almost negligible and to those who maintained that aquatic organisms could not at all derive nutrition from dissolved organic matter, and on the other hand to those supporters of PUTTER who demonstrated the permeability of the skin of certain amphibia and fishes both to organic and inorganic solutions, and finally concentrating on the utilization of material in solution by mosquito larvae.

Here the author refers to his own demonstration (1930) that the larvae of *Aëdes aegypti* can from disinfected eggs be reared to maturity in Berkefeld-filtered water containing only organic matter in solution and colloids in suspension, and quotes the other workers who have shown that other larvae, including Anopheles, can find nourishment in sterile water and can grow for some time on normal water colloids or on water containing only dissolved products of decayed vegetation. He quotes also the workers from the Wisconsin University who have found that the natural fresh water of one of the local lakes contains nine times as much soluble nitrogen as the total plancton nitrogen ; also other (unpublished) work demonstrating that *Aëdes aegypti*, *Culex 5-fasciatus*, and *C. salinarius* get nourishment from the non-dialysable fraction of water from their breeding-pools, and much other cognate work recently published. The ability to absorb non-dialysable matter through the unbroken skin still requires demonstration, but why, asks

the author, should not such material be absorbed from the large amount of water that passes through the intestine of, *e.g.*, mosquito larvae ?

This compendious review should be read in original, and a good list of relevant documents is attached to it. *A. A.*

BRUG (S. L.). **Chitinisation of Parasites in Mosquitos.**—*Bull. Entom. Res.* 1932. July. Vol. 23. Pt. 2. pp. 229–231. With 4 figs. on 1 plate. [11 refs.]

The author quotes with references several instances of the chitinous encapsulation of parasites in mosquitoes, that have been described and discussed—*e.g.*, " black spores " of Proteosoma-infected *Culex pipiens*, dead larvae of *Filaria bancrofti* in infected *Aëdes variegatus*, and he here describes and figures another instance, namely the chitinization of an undetermined Protozoon parasite in a *Taeniorhynchus annulatus* that had been experimentally infected with *Microfilaria malayi*. *A. A.*

TROLLI (G.). Rapport préliminaire au sujet de la présence et de la vitalité des insectes et des rats, et notamment des moustiques, à bord des avions au Congo Belge. [**Preliminary Report on the Presence and Vitality of Insects and Rats, and Particularly of Mosquitoes, on board Aircraft in Belgian Congo.**]—*Bull. Office Internat. d'Hyg. Publique.* 1932. Apr. Vol. 24. No. 4. pp. 603–612.

A preliminary report of some investigations in Belgian Congo of the ability of the creatures—particularly of mosquitoes—known to transmit specific infections to maintain life at heights commonly traversed by aircraft. Many observations were made, mainly by medical officers of airports, and much detail is given. Only four times were living insects (mosquitoes all) captured in an airship on arrival from a voyage ; in two cases after a flight of 6¼ hours made on the same day with calls at two places on the way, and in two cases after a flight of 8 hours with an all-night stoppage on the way ; and in all four cases the greatest heights traversed by the aircraft were 1,000 metres. In two cases all the mosquitoes remained alive for some time after capture and in two cases they did not. In the air-voyage from Boma to Elizabethville no mosquito has been found, hitherto, in aircraft flying at 1,700 to 2,400 metres.

In addition to the search for evidence of the ability of infective insects to withstand the imminent deadly vicissitudes of the aircraft en route, inquest has been made of the mosquito tenantry of hangars and the air-planes from time to time stationary in them, and some experiments have been made of the effects of air-travel on caged mosquitoes. *A. A.*

GRIFFITTS (T. H.) & GRIFFITTS (J. J.). Sur le transport des moustiques par les avions. [**The Transference of Mosquitoes by Aeroplanes.**]—*Bull. Office Internat. d'Hyg. Publique.* 1932. June. Vol. 24. No. 6. pp. 948–952.

An interesting account in full detail of operations and observations demonstrating the part that can be, and is, taken by ordinary aeroplanes in carrying common mosquitoes like *Aëdes aegypti* and *Culex*

quinquestriatus from place to place and for long distances. Several types of air-craft were used in experiment—Fokkers, Sikorsky water-planes, and Commodores—102 inspections of them were made in the course of experiment, and all the apparatus, etc., is described; 21 of the experiments disclosed the presence of mosquitoes in aircraft in the ordinary course of long voyages, with stoppages en route, under the ordinary conditions of passenger traffic with baggage to be shipped and unshipped and entrances and exits for it and passengers to be opened as required at ports of call. To discover the distance that mosquitoes may thus be carried, 40 stained mosquitoes, chiefly *Ae. aegypti* ♂♂ and ♀♀, were turned loose in different parts of a trimotor Fokker starting on a voyage of 1,250 miles (from S. Juan to Miami) making 3 stoppages and occupying 9 hours and 53 minutes, with an hour and 9 minutes for the 3 stoppages. At the end of the voyage 10 *Ae. aegypti*, 2 *C. quinquefasciatus*, and an unidentified mosquito were discovered in the cabin and fuselage of the aircraft. Some details of other experiments are given, but the authors' general conclusion is that if a considerable number of mosquitoes are in an aeroplane when she starts on a long journey (2,000 kilometres) to be completed in a day and with repeated stoppages at ports of call, about one-fifth of that number are likely to finish the journey. In the normal condition of natural mosquito-breeding about airports, however, they think it unlikely that an air-plane would be heavily infested when starting on a voyage, or that infected *Aëdes aegypti*, although of course they might make the voyage, are not as important in starting epidemics as infected human beings are.

A. A.

SCHARFF (J. W.). **VII. Anti-Mosquito Measures.**—*A Note on Public Health Administration in the Northern Settlement.* [Penang, Straits Settlements.] pp. 16–23. With 29 photos.

Although at first sight this most excellent report appears to be merely of local interest, since it reviews the progress of antimosquito antimalaria work in rural areas of the Northern Settlement of Penang, it really has an oracular significance for all British Overseas Dominions that are affected and encumbered by malaria. One outstanding feature is a gallery of 32 beautiful photographs—a vivid and many-sided display of anti-mosquito work done in a few years (and still in progress). How has this work been done and how is it maintained? First of all, liberal financial provision has been made to the Health Branch of the Public Works Department for antimalaria work in rural areas, and in this provision the cost of a technically well-trained subordinate antimosquito staff is included. Constant search for larvae and breeding-places of dangerous mosquitoes is kept alive by mosquito surveys, and on these surveys anti-mosquito measures and programs are based and maintained. The text gives some account of the results of this work. In the Penang rural area, in the course of eleven years, there has been a progressive reduction in the annual number of deaths from malaria from 665 in the year 1921 to 395 in the year 1931; in eight other rural areas, in the course of 7 years (1925 to 1931) there has been a reduction in the annual number of boys with an enlarged spleen from 244 to 86, and in another eight rural areas, in the same 7 years, from 370 to 264. "The effect has been to transform the appearance of villages. In place of miserable and weakly children there are now

sturdy youngsters." Similar evidence of reduction in annual number of deaths from malaria and of schoolboys with enlarged spleens is given from the records of the Wellesley Province. *A. A.*

HOLT (R. L.) & KINTNER (J. H.). **Antimosquito Sprays.**—*Philippine Jl. Sci.* 1932. Apr. Vol. 47. No. 4. pp. 433–438.

Here are set forth several formulae for sprays for killing mosquitoes in large indoor spaces, such as hospital wards, without hurt to inmates or damage to draperies. The chief lethal agent in these sprays is pyrethrum, and a convenient and inexpensive contributory agent (and a vehicle) is purified kerosine ; CS^2, and acetone, and chloroform were severally employed as solvents of pyrethrum, but since the first two of these, although highly toxic to mosquitoes, are dangerously inflammable and since also the odour of CS^2 is offensively unfragrant and the fumes of acetone are otherwise discomforting to inmates, chloroform is the one recommended. Sixty grams of powdered pyrethrum are treated with 120 cc. of chloroform for two hours with frequent shaking, then filtered through a Buchner funnel, and the filtrate (averaging about 50 cc.) made up to 1,000 cc. with kerosine. The efficiency of this fragrant spray as an insecticide approaches that of mixtures prepared with the loathsome CS^2 and the nauseating acetone.

The manner of using the spray in a large ward, and the lethal effects upon insects, as described by the senior author of this paper, have been quoted in this *Bulletin* (*ante*, p. 318). *A. A.*

KLIGLER (I. J.). **The Movements of Anopheles at Various Seasons of the Year with Special Reference to Infected Mosquitoes.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. June 30. Vol. 26. No. 1. pp. 73–88. With 2 graphs. [24 refs.]

Largely but not entirely from his own observation of anophelines (of a locality in Palestine) the author criticizes the habit of giving wide general application to generalities based on a single species. That Anopheles travels relatively short distances ; that it is essentially zoophile ; that it remains a long time in the house where it has fed ; and that it has " homing " instincts, may be valid observations in time, place and season and for a particular species, but must not be assumed as universal substantiated truths. In Palestine, for instance, the range of flight (*e.g.*, of *A. elutus*) depends on various circumstances, besides being far greater in the period before hibernation when the insect is seeking shelter than it is in the active feeding and breeding season of spring and early summer. With regard to resting-places—the length of stay where the insects have fed and the strength of attraction of zoophily—for although it is likely enough that zoophile strains may occur, evidence is here given that what might in a particular village seem to be zoophily (preference of a stable) is a seasonal phenomenon or even an accident ; other evidence from precipitin tests of blood taken in houses and stables, " tends to emphasize the restlessness of anopheles rather than their stability." With regard to the movements of infected mosquitoes, observations here recorded show that infected mosquitoes (cysts and sporozoites) were found in stables as well as in houses at all times of the year, which is no argument for a definite " housing " or " homing " instinct after infection. [This paper should be read ; it is by papers of this kind, consisting of local observations

and critical examination of hypotheses, rather than by dogmatic enforcement of plausible assumptions that scientific knowledge of mosquitoes in relation to malaria is increased.] *A. A.*

ROUBAUD (E.) & GASCHEN (H.). Concurrence larvaire et peuplements anophéliens. [**Results of Overcrowding of Anopheles Larvae.**]—*Bull. Soc. Path. Exot.* 1932. May 11. Vol. 25. No. 5. pp. 428–431. With 1 text fig.

The authors emphasize the stunting and the great mortality that occurs among young anopheline larvae late hatched on surface waters already crowded with older larvae ; according to them it is particularly the " auto-elimination " of the larval issue of individuals thus stunted in their growth that contributes to the suppression of paucidentate females in an " unstable zoophile fauna." *A. A.*

BRADLEY (G. H.). **Some Factors associated with the Breeding of Anopheles Mosquitoes.**—*Jl. Agric. Res.* 1932. Mar. 1. Vol. 44. No. 5. pp. 381–399. With 6 text figs.

This critical comparison of environmental characteristics of areas where Anopheles is found breeding and areas where it is not found breeding in the Louisiana Delta region, what though it may not bring out anything strikingly new, is interesting generally as well as practically useful on the spot. The region lies in a flat country with many shallow " lakes " and sluggish overgrown and choked streams known as *bayous*. Characteristics noticed as favouring Anopheles were various kinds of green silkweeds, moderate growth of duckweed (Lemna), and vegetable flotsam, and such things as afford protection from natural surface foes. Characteristics unfavourable for Anopheles were rapid fall in level of surface of water (leading to stranding of protective flotsam) ; complete overgrowth of duckweed ; predominance of blue-green silkweeds ; shady waters with a large and varied plancton and less green aquatic vegetation. With regard to characters of the local waters that seemed to be indifferent for the breeding Anopheles the author instances summer temperature of atmosphere ; range of pH concentration, the waters generally being alkaline, except in an unshaded impounded *bayou* ; and composition of the plancton, it having no constant variation and everywhere containing about the same percentage of the same commonest genera of Flagellata, and gut examinations of larvae showing that all organisms of suitable size are likely to be swallowed. The paper is full of detail well digested and assimilated. *A. A.*

KOIDZUMI (Makoto) & MORISHITA (Kaoru). **The Identification of the Formosan Anophelines.**—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1932. Mar. Vol. 31. No. 3 (324). [In Japanese. English summary pp. 28–29.]

" After careful re-examination of many specimens, and thorough collation of the earliest and latest literature," and much debate internal of a few " rather rare " species still recalcitrant, the authors decided finally that the species of Anopheles inhabiting Formosa are, like the Muses, nine in number, namely, *hyrcanus* var. *sinensis*, *lindesaii*, *minimus*, *jeyporensis* var. *candidiensis*, *maculatus*, *ludlowi*, *fuliginosus*,

tesselatus, and *maculipalpis* var. *splendidus*. In the course of these final identifications 9 new species of previous Japanese authorization have been suppressed. *A. A.*

TOUMANOFF (C.). Sur les gîtes larvaires types des anophèles au Tonkin. [**Types of Larval Nurseries of Anopheles in Tonking.**]—*Bull. Soc. Path. Exot.* 1932. June 8. Vol. 25. No. 6. pp. 639–656. With 11 figs. on 4 plates & 4 graphs. [14 refs.]

A methodical study of the nurseries of Anopheles larvae in Tonking where 14 species are represented. Although there is more or less "ubiquity" of breeding-places for most of the species, some of them show marked predilections, and this is particularly so with *A. maculatus* which is adapted to streams with a swift current and rocky pools with little or no water-weed, and with *A. minimus* which is usually found in running water edged with vegetation and is very rare in stagnant water. *A. vagus* prefers stagnant water in spite of its ubiquity, but is often found in running water containing vegetation though never in clear swift water. *A. hyrcanus sinensis* has no particular preferences. *A. jeyporiensis* and *A. aconitus* are found most often in running water, though *aconitus* is also to be met with in the pools of the rainy season. *A. fuliginosus* likes water permanent or not, with plenty of vegetation, and avoids clear water. Of other Tonking species *barbirostris*, *philippinensis*, *kochi*, *karwari*, *aitkenii* do not show any striking specific tastes. The fact that *A. maculatus* and *A. minimus*, which are the principal malaria-carriers of Tonking have their chosen breeding-places facilitates the operations of the medical entomologist. *A. A.*

TOUMANOFF (C.). Contribution à l'étude de la faune anophélienne d'altitude au Tonkin. [**Contribution to the Study of the Anopheline Fauna of the Highlands of Tonking.**]—*Bull. Soc. Path. Exot.* 1932. July 6. Vol. 25. No. 7. pp. 770–788. With 24 figs.

Anopheles lindesaii Giles and *A. gigas* var. *baileyi* Edw., the larva and adult of both of which the author describes, with parcel figures, are said to be of frequent occurrence in the highlands of Tonking, the larvae of the two species together forming 43–44 per cent. of the Anopheline larval fauna of the high country; that of *lindesaii* being common in summer (rainy season), and that of *gigas* var. *baileyi*, being found most frequently in winter (dry season), and both of them occurring in running water of various kinds. A third species, the larva of which inhabits the flowing water of the same heights, and is here briefly described, is *A. aitkenii* James. *A. A.*

ESSED (W. F. R.). De gezondmaking van Banjoewangi, een typisch voorbeeld van species-assaineering volgens Swellengrebel. [**Sanitation of Banjoewangi (Java). Species Sanitation.**]—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1932. Vol. 21. No. 2. pp. 41–50. With 2 figs. on 1 plate. English summary.

The English summary states that in 1927 the author came to the conclusion that malaria at Banjoewangi on the east coast of Java was due to *Anopheles ludlowi* which was breeding in the fish-ponds formed from an old lagoon of a river there. He therefore advised that the dykes should be destroyed and the fish-ponds obliterated and the

dangerous area restored to its original primitive physiographical condition; and this was done at a cost of 23,000 guilders. At the present day instead of dangerous fish-ponds one sees a harmless "mangrove forest," and neither larvae nor adults of *A. ludlowi* are to be found; and as a consequence the recorded spleen-index of village children in the neighbourhood shows enormous improvements. "Thus is shown . . . a perfect example of species sanitation in the sense of SWELLENGREBEL." *A. A.*

WALCH (E. W.). Het verband tusschen de voorkeur van Nederlandsch-Indische anophelinen voor menschen- of dierenbloed en haar gevaarlijkheid (tweede mededeeling). [**The Relative Danger from Anthropophile and Zoophile Anophelines in D.E.I.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1932. May 24. Vol. 72. No. 11. pp. 682–709. [Refs. in footnotes.] English summary.

According to the English summary, precipitin tests of the blood in the stomach of Anopheles caught in houses or stables in Netherlands India disclosed 86 per cent. of *A. ludlowi* and 83 per cent. of *A. sinensis* to contain human blood, *A. ludlowi* being the most dreaded malaria carrier in the Netherlands India Archipelago, and *A. sinensis* perhaps the chief carrier in South Sumatra. With these two anthropophile species Walch is inclined to class *A. leucosphyrus* (a carrier in Sumatra), *A. punctulatus* (the most dangerous carrier in the Moluccas), and *A. umbrosus* (a dangerous carrier in West Borneo). Below all these on the list of biters of man come *A. aconitus* and *A. rossi* which are classed as usually malaria-carriers of secondary importance; and below these again *A. tesselatus* and *A. vagus*, which are classed as harmless. For *A. maculatus*, *A. kochi*, and *A. fuliginosus* the exact position is hard to assign at present, Walch can only call them more or less zoophile species. In districts where cattle are scarce, however, *A. leucosphyrus*, *A. maculatus*, and *A. aconitus* show a high percentage of females glutted with human blood; severe malaria (with an infection rate of 3·5 per cent.) caused chiefly by *A. aconitus* has been recorded in such a district.

The results of the above blood-precipitation survey of female Anopheles caught in houses and stables are offered as perhaps assisting to explain (1) why of over 40 species of Anopheles known to inhabit the Netherlands India Archipelago only about 10 species are known to transmit malaria in Nature; and (2) why one and the same species may be notorious as a malaria-carrier in some places and may be adjudged a harmless zoophile species in other places. *A. A.*

LALLEMANT (G. F. M. Avé), SOEKONO (M.) & STOKER (W. J.). Proeven over de vliegwijdte van enkele anophelinen. (Tweede Mededeeling.) [**The Range of Flight of Certain Anophelines.**]—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1932. Vol. 21. No. 2. pp. 17–20. With 2 graphs. English summary (3 lines).

The English summary contains the bare statements that from a total number of 3,451 marked anophelines [liberated ?] 51 were recaptured; and that among those recaptured were 3 individual *A. aconitus* at a distance of 900 metres, 1 *A. rossi* and 2 *A. sinensis* at a distance of 1½ km., and 1 *A. kochi* and 2 *A. tesselatus* at a distance of 1 km. *A. A.*

ROUBAUD (E.). Les races trophiques de l'*Anopheles maculipennis* décelées par les élevages expérimentaux comparés. [**The Trophic Races of** *Anopheles maculipennis* **Disclosed by Experimental Breeding.**]—*C. R. Acad. Sci.* 1932. May 9. Vol. 194. No. 19. pp. 1694–1696.

In his Paris insectarium at the Pasteur Institute M. Roubaud has reared 15 different European stocks of *Anopheles maculipennis* from stock collected in places in Spain, Italy, Austria, England, France. (He has found that the living insects can be sent from afar by post, with a minimum of packing apparatus, in winter; they may arrive at Paris in a state of inertia and seeming dead, but when placed in a moist atmosphere at a "mild temperature" they recover all their faculties). By study of these 15 European stocks M. Roubaud can distinguish among them two distinct types, namely a paucidentate type where the number of teeth in the female maxilla is not more than 14, generally 13–14; and a multidentate type where the females have 15 or more teeth in that organ.

The *paucidentate* stock is represented in 2 of the 15 places, Murcia in S. Spain and Tor Tre Ponti in the *malarious* Pontine Marshes. Their females have revealed "anthropophile preferences"; they preferred the human arm to the guineapig, recourse to the human arm having been indispensable for their true breeding and only with this guarantee did they breed true for three generations.

In all the other multidentate stock of this study the females preferred the guineapig to the human arm, taking their fill with ease and rapidity from that animal—in short, displaying their "elective zoophily." A good and true instance of this "endemic elective trophic zoophily" is obvious in the multidentate female *A. maculipennis* of the *non-malarious* district of Massarosa in Tuscany.

The distinction between the multidentate zoophile and the paucidentate anthropophile *Anopheles maculatus* is thus based upon that symbol of persistive constancy—the female maxilla. *A. A.*

ROUBAUD (E.). Recherches sur les variations trophiques et biologiques des peuplements de l'*Anopheles maculipennis*. Etude préliminaire. [**Researches on the Trophic and Biologic Variations of the Populations of** *Anopheles maculipennis*. **A Preliminary Study.**]—*Bull. Soc. Path. Exot.* 1932. July 6. Vol. 25. No. 7. pp. 755–762. With 6 figs.

Roubaud describes how he has brought together in the Insectarium of the Pasteur Institute a large number of *Anopheles maculipennis* from different regions, and how by study of their life in the laboratory he has been able to recognise 15 living stocks (*souches*) which are much easier to distinguish from the biological than from the morphological point of view. From his comparative studies he distinguishes broadly between Trophic races and Biologic races, the former being differentiated morphologically mainly by the maxillary index of the female, and the latter biologically mainly by the habits and behaviour of the female in winter. Thus of the Trophic races some are anthropophile (or at any rate are not specially addicted to zoophily) and others are distinctly zoophile. The Biologic or "poceilobiotic" races are sub-divided into those that are Homodynamous and those that are Heterodynamous. In the homodynamous series reproduction in the female is in full winter simply subordinated to the influence of cold and is not a

" process of spontaneous reproductive inertia " ; under the influence of warmth such females may at times become active in winter. In the heterodynamous series the females in winter suffer an " obligatory ovarian diapause " ; they are affected by a spontaneous ovarian inertia or asthenobiosis which lasts for weeks even when warmth at times intervenes. Another biological difference that may be estimated as racial is the variable aptitude of the females of *A. maculipennis* for coupling in winter, the extremes of this variability being distinguished in the opulent terminology of this paper as Stenogamy and Eurygamy. The small short-winged Holland variety *atroparvus* which reproduces readily in small cages is the chosen example of stenogamy, in contrast with the forms having longer wings, adapted for ample pre-nuptial flight, that exemplifying eurygamy. *A. A.*

HACKETT (L. W.), MARTINI (E.) & MISSIROLI (A.). **The Races of** *A. maculipennis.*—*Amer. Jl. Hyg.* 1932. July. Vol. 16. No. 1. pp. 137–162. With 5 figs. [16 refs.]

The authors' observations in many areas of Germany and Italy have confirmed FALLERONI's differentiation of two races of *A. maculipennis*. One race, *labranchiae*, Falleroni, has a uniformly dappled egg with relatively small floats posteriorly placed. " The egg occurs as a light gray type in Italy (but never in pure culture) and as a dark gray type in North Germany." This race is found in brackish marshes near sea, or inland where the water has a relatively high salinity ; " it also occurs in all areas so far studied where malaria is actually or potentially present, and it appears to be relatively more prevalent in dwellings than the other race." It is relatively active in houses and stables throughout the winter even in northern Europe—like *A. maculipennis atroparvus* of v. Thiel.

The other race, *messeae*, Falleroni, has " an egg irregularly pigmented in bars and angular patches but including always two heavy transverse bands just distal to the ends of the float structures which . . . are relatively large and long. This race occurs in inland fresh waters in Italy and Germany, in the proportion of 95 per cent. of the entire local *maculipennis* population, and each variation except pure black has been found in pure strains in several regions." It predominates in non-malarious areas, frequents stables more than dwellings, and goes into complete hibernation. Dark dappled grey, light dappled grey, and barred and banded eggs are figured in plenty. *A. A.*

DE BUEN (Eliseo). **Studies relating to the Biology of** *Anopheles maculipennis* **with Special Reference to the Dwellings of Man and Animals.**—*Jl. Trop. Med. & Hyg.* 1932. Aug. 15. Vol. 35. No. 16. pp. 242–247. With 3 charts.

These studies, proceeding from the Malaria Institute, Navalmoral de la Mata, Spain, and full of local detail regarding the distribution of larvae and the movements of adults of *Anopheles maculipennis*, were addressed chiefly to the question, why do anophelines enter stables and dwellings? why do they linger in them? why do they leave them? The conclusions reached with regard to larvae are that the broods of the first generation are to be found in waters close to both inhabited dwellings and stables, but later generations may be found in all waters far or near. In the area under observation females may breed in cold

and wet weather and may emerge even in the excessive heat of a dry summer; this may explain the short survival of such adults in open dry country in summer. In summer many people as well as cattle live scattered in the open; thus the need for long-distance flights is minimized. With regard to adults, mostly they enter habitations in order to bite; they remain in them to digest their food and mature their eggs; and they leave them in order to breed. In human dwellings the conditions of life are less favourable than in stables, so that individuals leaving the house with their eggs still undeveloped are more numerous than those so leaving stables. Some females return to the places where they have sheltered. Some bite in the open air as well as in houses. During the warmest months the number of *A. maculipennis* seen emerging from dwelling-places diminishes, and during cold weather they do not come out at all. These studies, of course, are meant to show how *A. maculipennis* keeps the tenour of its way in a particular locality. *A. A.*

FREEBORN (Stanley B.). **The Seasonal Life History of** *Anopheles maculipennis* **with Reference to Humidity Requirements and "Hibernation."**—*Amer. Jl. Hyg.* 1932. July. Vol. 16. No. 1. pp. 215–223. With 3 graphs.

According to the author there are six generations of *Anopheles maculipennis* in the Sacramento Valley of California, and the adults of the second and perhaps third generations have a life too short to transmit malaria. Activity begins in mid-February with a migration of wintering females into areas well out of the natural range of the species, where breeding is attempted but is "ecologically impossible." From the end of April until the third week in June the numbers of adults steadily increase, and then from June to beginning of September a slump occurs. This is explained as due to seasonal climatic changes —constant high temperature, and the failure of high humidities to protect the insects from its effect. Even at a relative humidity of 80 per cent. three days was the maximum length of life. Semi-hibernation lasts from November to late January or early February. There is no true hibernation, the females throughout winter biting on warm days or in heated buildings and often changing their resting-places. The migratory flight of *A. maculipennis* is compared with the migration of *A. elutus* in Palestine observed by KLIGLER and MER. *A. A.*

LEVENSON (E. D.). Observations sur l'action de différents agents chimiques sur le développement des larves d'*Anopheles maculipennis*. [**Action of Chemicals on Development of Larvae of** *A. maculipennis*.]—*Trop. Med. & Vet.* Moscow. 1931. Vol. 9. No. 10. pp. 499–504. With 1 fig. [In Russian. French summary.]

Experiments were conducted upon the larvicidal properties of caustic soda, and sulphuric, hydrochloric, nitric and carbolic acids, added to artificial peat-holes inhabited by larvae of *Anopheles maculipennis*. The main effect of these chemicals was to alter the pH. Satisfactory results were obtained with sulphuric acid only. If added in the proportion of 0·02 per cent. of the total volume of water to peat-holes with a clayey bottom it produces a marked fall of pH from 6·03 to 2·09—the latter reaction being maintained for a considerable time and killing off all the larvae. *C. A. Hoare.*

RUSSELL (Paul F.). **The Control of *Anopheles minimus* Mosquito Larvae in the Philippines by Stranding and Flushing. First Report.**—*Philippine Jl. Sci.* 1932. Apr. Vol. 47. No. 4. pp. 439–447. With 1 text fig. & 4 figs. on 1 plate. [10 refs.]

The chief carrier of malaria in the Philippines is said to be *Anopheles minimus*. (*A. maculatus* also has there been convicted as a natural carrier. " The so-called *A. ludlowi* of Luzon is not a vector in nature.") The larvae of both *A. minimus* and *A. maculatus* are most often found in the small streams of the foothills of the islands. An experiment of " periodically closing and opening a dam situated about halfway along the length of the stream—done twice on one day a week " was followed by a remarkable reduction in the number of larvae both above and below the dam. This method of stranding and flushing is recommended as simple and inexpensive for the stated conditions. *A. A.*

KING (W. V.). **Three Philippine Anopheles of the *Funestus-minimus* Subgroup.**—*Philippine Jl. Sci.* 1932. Aug. Vol. 48. No. 4. pp. 485–524. With 8 figs. & 2 plates. [21 refs.]

The author states that the *funestus-minimus* subgroup of Anopheles is represented in the Philippines by 3 species, one of which has been confused with the other two ; this species is here identified as *A. mangyanus* Banks. The other two species are identified as *A. minimus* var. *flavirostris* Ludlow, and *A. filipinae* Manalang. The var. *flavirostris* has come to be considered the only Philippine Anopheles of serious importance in malaria. Descriptions of the three species are given, together with notes on the " typical " *A. funestus*, *A. minimus*, and *A. aconitus*. *A. A.*

SHANNON (Raymond C.). *Anopheles gambiae* **in Brazil.**—*Amer. Jl. Hyg.* 1932. May. Vol. 15. No. 3. pp. 634–663. With 2 figs. & 4 maps. [22 refs.]

In March 1930 the notorious African malaria-carrier *Anopheles gambiae* Giles was discovered breeding in the city of Natal, Rio Grande do Norte, Brazil, and shortly after the discovery an unusually severe outbreak of malaria occurred in the vicinity of its breeding-grounds there. Its transport from Africa " appears to have been made possible " either by aircraft or by the quick mail-boats that require but four days for the trip from Dakar in Africa to Natal in Brazil. In investigations made nine months after its discovery " covering the coastal area of Brazil from Recife, Pernambuco, to Belem, Para " it was found only in Natal.

The paper contains, in addition to various useful illustrations in the text, a large amount of critical detail about *A. gambiae* [= " *Pyretophorus costalis* "] both in its indigenous tropical African home and in its new Brazil environment ; drawing attention, with regard to its African record, (*a*) to its facile breeding in shallow sun-exposed waters, and particularly to ditches, drains, pits, rain-pools, etc., besides natural streams, backwaters, etc., and (*b*) to its practical disappearance in the dry season in certain arid African regions where that season is pronounced ; and giving, with regard to its invasion of Brazil, an account of its spread and an estimation of its prospects there and descriptions of forty-two of its investigated Brazil breeding grounds. *A. A.*

EARLE (Walter C.). **Notes on the Life History of** *Anopheles albimanus* **and** *grabhamii.*—*Porto Rico Jl. of Public Health & Trop. Med.* 1932. Mar. Vol. 7. No. 3. pp. 381–384.

These observations of *Anopheles albimanus* testify that the majority laid their eggs on the 2nd (sometimes 3rd) night after a feed, beginning at 9 p.m., the average number being 160. The minimum term from egg to pupae was from 4 to 5 days. A volume of detail is given. *A. A.*

GHOSH (B.). **Comparative Study of Larval Characters of** *A. ludlowii* **(Theobald) and** *A. subpictus* **(Grassi).**—*Indian Jl. Med. Res.* 1932. Apr. Vol. 19. No. 4. pp. 1085–1090. With 6 text figs.

[If *A. Ludlowii* be really a species distinct from *A. subpictus*] then what the author considers to be distinguishing characters of the larvae of the two "species" are here stated and figured. *A. A.*

ROUBAUD (E.) & COLAS-BELCOUR (J.). Adaptation à la vie submergée hivernale chez les larves d'*Anopheles plumbeus.* [**Adaptation of Larvae of** *Anopheles plumbeus* **to Hibernal Submergence.**]—*C. R. Acad. Sci.* 1932. June 13. Vol. 194. No. 24. pp. 2178–2180.

Recalling some well-known facts about the tree-hole breeding *Anopheles plumbeus*, which winters as a larva, commonly submerged, the authors state that at that seaon the larvae are generally suspended vertically, head-downwards, by the caudal setae and that they can live thus completely submerged for 19, 47, or even 61 days and can stand successive freezing and thawing of the watery medium. Breathing in such circumstances would be carried on by the tracheal gills. *A. A.*

ROUBAUD (E.) & COLAS-BELCOUR (J.). Observations sur la biologie de l'*Anopheles plumbeus.* I. Le comportement larvaire. [**Observations on the Biology of** *Anopheles plumbeus.* **I. Larval Behaviour.**]—*Bull. Soc. Path. Exot.* 1932. July 6. Vol. 25. No. 7. pp. 763–770. With 4 figs. on 1 plate. [15 refs.]

In describing the fairly well-known natural history of the tree-hole larva of *Anopheles plumbeus*, the authors, working in the laboratory, draw attention to the following points. With regard to the water of the tree-hole, with its usual dark colour and richness in dissolved organic matter including tannin, although it may attract the pregnant female she may also sometimes deposit her eggs in clear pure water in which the larvae may develop as adequately as larvae nourished in a tannic maceration. Although the larvae from the tree-hole are obviously negatively phototropic, they soon get used to light when treated experimentally; and, conversely, when experimentally inured to light they soon resume their "normal lucifugal character" if returned to obscurity. Many writers have noticed the small amount of liquid often contained (along with leaves and debris) in the tree-holes; the authors find that the evolution of larvae may be completed under conditions of mere moisture in which the larvae cannot swim freely. Great attention is directed to attitudes assumed by the larva, particularly to a fixed position vertically head-downwards that the young larvae may take when completely submerged in winter and to the prehensile modification of the caudal setae that facilitates this fixation under water. *A. A.*

DAVIS (Nelson C.). **The Effects of Heat and of Cold upon** *Aëdes* (*Stegomyia*) *aegypti.—Amer. Jl. Hyg* 1932. July. Vol. 16. No. 1. pp. 177–191. [19 refs.]

This paper deals with the effect of high and low temperatures on *Aëdes aegypti* ; Part I deals with the effect on the eggs, Part II with the effect upon the adults. Both parts contain a good deal of cited introductory detail of a retrospective kind besides the description and tabulated summaries of the author's experiments. 1. With regard to eggs. In these experiments (the methods of which are described in detail) a temperature of —5·5°C. killed eggs in about 48 hours ; even after 6 hours the larvae that hatched from matured eggs were unable to survive, and after 30 hours some fresh eggs hatched later on and one larva pupated. At 0°C. a few fresh and matured eggs hatched after an exposure of 11 days. At 8° to 10°C. a small percentage of fresh eggs hatched after an exposure of 14 days, but none of the larvae lived ; matured eggs however appeared to be not affected even after 7 to 8 weeks. At 36°C. no effect on either fresh or matured eggs after exposure of 2 weeks. At 40°C. fresh eggs all dead at 48 hours, matured eggs dead before end of week. At 45°C. both types of eggs dead at 24 hours.

With regard to adults. Temperatures of 36°C. or higher had a very deleterious effect on larvae, pupae, and adults ; many pupae died, and some of the adults were drowned beside their pupal cases ; At 36°C. a colony of the mosquitoes died out in the second generation. At 18°C. the mosquitoes appeared lethargic, but larval growth and pupation were noticeably accelerated after a change to 19°C. *A. A.*

BONNE-WEPSTER (J.) & BRUG (S. L.). **The Subgenus Stegomyia in Netherland India.**—*Bijblad o.h. Geneesk. Tijdschr. v. Nederl.-Indië.* 1932. Apr. Bijblad 2. pp. 39–119 (5–85). With 22 text figs. [6 pages of refs.]

Stegomyia in general ; morphology, taxonomy, biology. *Aëdes* (*Stegomyia*) *fasciatus* ; morphology, breeding-places, eggs, larva, pupa, imago, parasites, natural enemies, as a disease carrier, control, geographical distribution. Morphology and biology of *Ae.* (*S.*) *albopictus* and *var.* ; *variegatus* and *var.* ; *albolineatus* ; and of *annandalii, gardnerii, desmotes, w-albus,* and *treubi.* *A. A.*

GRANT (H. G.), NEWMAN (Barclay M.) & WOOD (Pierce D.). **The Action of Colloidal Paris Green on the Larvae of** *Culex apicalis.* **A Preliminary Report.**—*Public Health Rep.* 1932. June 3. Vol. 47. No. 23. pp. 1239–1247.

Observations and experiments upon the toxicity of four different colloidal preparations of Paris green for *Culex apicalis* larvae, at Richmond (Virginia) July–October. Under laboratory conditions colloidal Paris green was toxic in one part to five million parts of water (by weight). " Colloidal preparations made from a solution of Paris green in concentrated NH_4OH gave the best results of any of the preparations used, killing all larvae placed in 1 to 5,000,000 dilutions within periods ranging from 19 hours to 3 days." It may possibly " be developed as an effective and comparatively inexpensive mosquito larvicide." *A. A.*

SINTON (J. A.). **Notes on Some Indian Species of the Genus Phlebotomus. Part XXX. Diagnostic Table for the Females of the Species Recorded from India.**—*Indian Jl. Med. Res.* 1932. July. Vol. 20. No. 1. pp. 55–74. With 57 figs. on 3 plates. [10 refs.]

The known Indian species of Phlebotomus in the year 1910 numbered seven, and they were specifically differentiated mainly by differences of colour and variations in wing-venation. At the present time 27 Indian species and 6 varieties are recognized by the author of these Notes and of the Diagnostic Table for the identification of the females of these species. In the introduction to this Table the species are arranged in 3 main groups according to the nature and distribution of the abdominal hairs, and within each group are differentiated mainly by structural variations in the buccal cavity, pharynx, and genitalia (spermatheca and male genitalia). The Notes also contain an explanation of the terminology of the Table, instructions for the collection, preparation, storage, mounting and examination of specimens, and a statement of the geographical distribution of the Indian species.

A. A.

CORSON (J. F). **A Note on Tsetse Flies.**—*Jl. Trop. Med. & Hyg.* 1932. Apr. 1. Vol. 35. No. 7. pp. 97–98.

The flies of this paper are *Glossina morsitans* and *G. pallidipes*. When captured wild flies of these species were allowed to feed on sheep and goats fatal infections of *T. congolense* and of *T. brucei* (or *rhodesiense*) quickly appeared among those animals. Laboratory-bred flies (from pupae of captured flies of both species) when allowed to feed on the sheep and goats thus infected were in the course of about six weeks found in a large proportion of cases to have the salivary glands infected.

The pupal term in male flies was usually two days longer than in females. It was found that a fly in captivity may abstain from feeding for as much as fourteen days without apparent detriment or loss of activity. The flies, in bottles, bit readily in complete darkness. They readily attacked and fed on fowls, guineafowls, and francolins, the birds being quite indifferent to them. Pairing took place between males of *G. swynnertoni* and females of *G. morsitans* and all the resulting pupae gave issue to females resembling *G. morsitans* more than *G. swynnertoni*. The author does not claim novelty for all his observations. *A. A.*

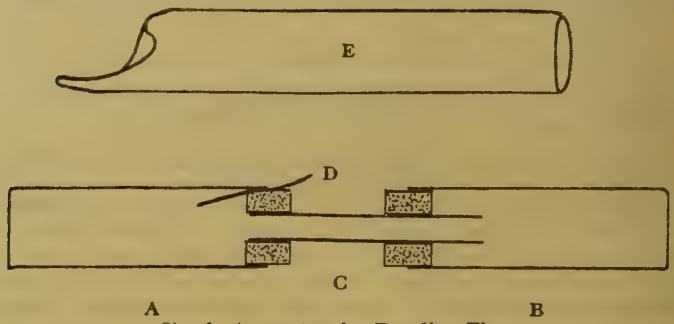
SYMES (C. B.) & ROBERTS (J. I.). **A List of the *Muscidae* and *Oestridae* causing Myiasis in Man and Animals in Kenya, recorded at the Medical Research Laboratory, Nairobi.**—*East African Med. Jl.* formerly *Kenya & East African Med. Jl.* 1932. Apr. Vol. 9. No. 1. pp. 18–20.

Species of Muscidae known to cause myiasis in man and of Oestridae in animals recorded in the laboratory at Nairobi are: Sarcophaga 2 spp., 4 cases (2 being in stools); Calliphora 1 sp., 1 case; *Lucilia sericata*, 4 cases; *Chrysomyia bezziana*, 1 case; *Auchmeromyia luteola*, common; *Cordylobia anthropophaga* common; and *C. rodhaini*, 1 case in European, common in animals. Species of *Oestridae*:—*Oestrus ovis*, in sheep; *Oestrus variolus*, in nose of hartebeest; *Gedoelstia cristata* and *G. hassleri* in nose of hartebeest. *A. A.*

HICKS (E. P.). **A Simple Apparatus for breeding Fleas.**—*Ann. Trop. Med. & Parasit.* 1932. July 14. Vol. 26. No. 2. pp. 147–148. With 1 fig.

The breeding apparatus figured and described, which was devised for dealing with cultures of the chigger (*Tunga penetrans*), is for use in the breeding of fleas against the time when the larvae are about to pupate; by its use when in the further course of time the adults issue from the cocoons they can be removed from time to time without interference and damage to the rest of the culture.

"Two glass containers, A and B, are fitted with bored corks through which passes the glass tube C. One end of the tube is flush with the inner surface of the cork in A, the other end projects into the interior of B. A slip of damp blotting paper, D, may be inserted between the cork and side of A to raise the humidity, if necessary. In dealing with a flea as small as *T. penetrans* it is as well to cover the corks with wax, to prevent the escape of the fleas through some unnoticed crevice. A cylinder of brown paper, E, is made to fit the apparatus from the base of A to the cork of B. This is loose and can be slipped on and off.



Simple Apparatus for Breeding Fleas.
[Reproduced from the *Annals of Tropical Medicine and Parasitology*.]

"The size of the containers in use is 75 × 22 mm., and the bore of the tube is 8 mm.; but presumably the dimensions are not of great importance.

"The culture of the larvae, with the material in which it is breeding, is placed in A, the apparatus is closed, and the brown paper cylinder slipped over A. As the adults emerge inside the dark container, they make for the light and find themselves in B. When sufficient adults have collected, the container B, complete with its cork, is slipped off the tube C, cotton wool plugs are fitted into the tube C and the cork of B, and the fleas are killed, if desired, by blowing chloroform vapour into B by means of a capillary pipette. When the fleas have been removed, B may again be fitted on to the tube C, after allowing a short time for the chloroform vapour to disperse. During the time that B is separated from the apparatus, the brown paper cover should be removed from A, so that the fleas may not be encouraged to wander down the tube.

"This apparatus made it possible to observe that, of a culture of *Tunga penetrans* bred from eggs laid by a number of fleas on the same day, the females emerged before the males." *A. A.*

BUXTON (P. A.). **The Climate in which the Rat-Flea lives.**—*Indian Jl. Med. Res.* 1932. July. Vol. 20. No. 1. pp. 281–297. With 4 figs. [23 refs.]

This is not an easy paper for summary. In his discussion the author states that it "is not principally a record of fact, but a discussion of a

point of view" and "is agnostic rather than informative." And in his summary the point of view appears in a suggestion that "if further facts were available and if more were known of the precise relation between climate and fleas at various stages, it would become possible to construct buildings within which the climate would be unfavourable to fleas." From this point of view the knowledge wanted is to be obtained by study of temperature and humidity in granaries, cellars, rat-holes, and in the rat's nest and the dust in which the larvae live; and here information is given on methods and apparatus of study and particularly on the measurement and record of changes in humidity, where ordinary meteorological methods are inadequate. *A. A.*

LEESON (H. S.). **The Effect of Temperature and Humidity upon the Survival of Certain Unfed Rat Fleas.**—*Parasitology.* 1932. June. Vol. 24. No. 2. pp. 196–209. With 4 charts. [17 refs.]

The technique of previous experimental work on effect of temperature and humidity on unfed fleas is criticized, and the author's methods and apparatus are recalled. In his experiments 2,027 *Xenopsylla cheopis*, 999 *X. astia*, and 646 *Ceratophyllus fasciatus* were used, all unfed and less than 24 hours old at the outset of the experiments. The following are the conclusions.

Length of life is not affected by sex. High temperatures and low humidities tend to shorten life. Low temperatures and high humidities (with a possible optimum of about 90 per cent.) tend to prolong it. Humidity is at maximum efficiency in this respect at about 18°C.; but at 37°C. humidity ceases to have any effect upon the duration of life of unfed fleas. "There is no direct proportion between survival of unfed fleas and saturation deficiency of the atmosphere at any temperature." *C. fasciatus* was the longest lived at similar atmospheric conditions. *X. astia* lived longer than *X. cheopis* at all humidities at 23°C. *A. A.*

i. GIRARD (G.), ROBIC (J.) & HÉRIVAUX (A.). Note sur les puces de la région de Tananarive. [**Rat Fleas of Antananarivo.**]—*Bull. Soc. Path. Exot.* 1932. Apr. 13. Vol. 25. No. 4. pp. 381–383.

ii. FONQUERNIE (J.). Les puces du rat à Tananarive.—*Ibid.* pp. 383–386.

iii. ——. Les puces domestiques à Tananarive.—*Ibid.* June 8. Vol. 25. No. 6. pp. 542–543.

iv. ——. Les puces domestiques à Tananarive (note complémentaire). *Ibid.* July 6. Vol. 25. No. 7. p. 710.

i. From the first three authors we learn that in the Antananarivo district plague is endemi-epidemic and that the transmission of infection among human beings seems to be not worked by *Xenopsylla cheopis*. A study of the local fleas made between October 1930 and August 1931 disclosed the following facts: In twelve houses "indemnified" from plague the 3,000 fleas caught on natives and Europeans and in traps were 91 per cent. *Pulex irritans*, 10 per cent. Ctenocephalus (in houses with dogs and cats) and 1 per cent. *Echidnophaga gallinacea*; in three warehouses in the centre of the plague zone and frequented by rats the 526 fleas caught were 341 *Pulex irritans*, 184 Ctenocephalus, and 1 *X. cheopis*; and in some houses free from plague corpses, where 300 fleas were caught, 232 were *Pulex irritans*, 63 were Ctenocephalus, 11 were *E. gallinacea*, and 4 were *X. cheopis*. Of these 300 fleas 126 (including

the 4 *X. cheopis*) were marked and inoculated into 8 guineapigs and 11 mice—but none of these animals contracted plague. "It is exceptional then to find *X. cheopis* off the body of the rat, even in houses infected with human plague. Is *Pulex irritans* to be held guilty of transmitting bubonic or septicaemic plague among men? The question should be reconsidered and studied at Tananarive."

ii. The only information that Dr. Fonquernie can get about rat-fleas collected at Antananarivo is that given by GIRARD and LEGENDRE (*Bull. Soc. Path. Exot.* 1925, Nov. 11. See this *Bulletin*, 1926, Vol. 23, p. 292), and that given in a note (April-May 1925) published by the *Office International d'Hygiène Publique*, which determine them to be *Xenopsylla cheopis* 60 per cent., *Lept. musculi* 25 per cent., *Echidnophaga gallinacea* 15 per cent.—and these were floated from rats drowned in cresol solution.

Fonquernie gives here his monthly returns of fleas captured and examined and of cases of "murine" plague and human plague for a whole year. During the whole year over thirty-eight thousand fleas were captured from rats in Antananarivo and over thirty-thousand were examined. Of these nearly 23,000 were *Echidnophaga gallinacea*, over 5,600 were *X. cheopis*, nearly 2,300 were *Leptopsylla musculi*, 37 were *Ctenocephalus felis*, and 12 were *P. irritans*. During the whole year 10 cases of murine infection and 50 cases of human infection (bubonic) are noted.

iii. The author confirms the observations of GIRARD *et al.* that the domestic flea of Madagascar is *Pulex irritans*, *X. cheopis* being excessively rare in habitations of Antananarivo and its environs although it abounds on the rats of that region. Of 410 fleas collected by him there from March to September in habitations free from plague, 275 were *P. irritans*, 102 were *Ctenocephalus felis*, 25 were Tunga and 7 Echidnophaga, but *X. cheopis* was represented only by a single individual and *Leptopsylla musculi* not at all. It would seem, he infers, that the fleas of plague-stricken habitations still require investigation.

iv. A further note stating that of 998 fleas collected from March to December in 33 plague-stricken houses 890 were *Pulex irritans*; 8 were *X. cheopis*; 55 were *Ct. felis*; and 45 were Tunga. Of the 8 *X. cheopis*, however, 6 were captured, along with 3 *P. irritans* and 6 *Ct. felis*, in one house where cases of pulmonary and septicaemic plague occurred in succession. *A. A.*

i. SYMES (C. B.) & HOPKINS (G. H. E.). **Notes on Fleas of Rats and Other Hosts in Kenya.**—*Colony & Protectorate of Kenya. Med. Dept. Records of Med. Research Lab. No. 1.* 1932. Jan. 57 pp. With 1 chart. [11 refs.]

ii. ——. **Notes on Rats, Fleas and Plague in Kenya (II).**—*Ibid.* No. 3. 1932. Jan. 28 pp. With 3 charts.

i. This painstaking report deals severally with the eight Districts of Kenya, and is full of detail of local value regarding the specific provenance of the rodent and other hosts and the specific host-preferences of the rat-fleas in each district. In a general summary the fleas caught from these hosts numbered 32,553 individuals belonging to fifteen species. Of these, 11,463 were *Xenopylla cheopis*; 8,920 *X. brasiliensis*; 191 *X. humilis*; 106 *X. astia*; 2,146 *Dinopsyllus lypusus*; 535 *Ctenophthalmus cabirus*; 397 *Leptopsylla segnis*; and 5,585 *Echidnophaga gallinacea*.

X. cheopis is most commonly found on house-rats (*R. rattus*) and in more or less permanent buildings as in Nairobi, *X. brasiliensis* more commonly on the indigenous multimammate *R. coucha* in native huts and rustic constructions of mud and thatch. *X. cheopis* may be locally common on field-rats, particularly on *Arvicola abyssinicus* (vole). Mombasa is thought to be apt for *cheopis*-borne plague at all times of the year. There is circumstantial evidence against *X. brasiliensis* in Mombasa and S. Kavirondo, and suspicion against the field-rat (vole) *A. abyssinicus* in the Nakuru District.

ii. This is a continuation of the above report ; it covers a term of 17 months to May 1930 and deals with the breeding, nests and the fleas of the common local rodents. The fleas of *R. rattus* are *X. cheopis* and *brasiliensis* and in small numbers *D. lypusus*, *L. segnis*, and *E. gallinacea* ; *X. cheopis* mostly on town *rattus*, *X. brasiliensis* more in *rattus* of native reserve and estate areas. The prevalent flea on the three commoner field rats, particularly on *R. coucha*, in Nairobi is *Dinopsyllus lypusus* ; another adherent of field-rats and their nests is *Ctenophthalmus cabirus*. There seems to be little doubt that both *X. cheopis* and *brasiliensis* and also *Dinopsyllus lypusus* are concerned in plague transmission in Kenya. *A. A.*

MEIRA (João Alves). Alguns dados estatisticos sobre as pulgas de ratos na cidade de S. Paulo. (2a nota.) [**Rat-Fleas in S. Paulo.**] —*Brasil-Medico*. 1932. May 7. Vol. 46. No. 19. pp. 429–432.

Rats caught were divided into two categories (1) those in and about dwellings, and (2) those in and about warehouses. *Epimys norvegicus* largely predominated among the former, constituting 88·1 per cent. ; among the latter, though still the most common, it was found but little more than twice as frequently as *R. rattus* and *Mus musculus*. Of 363 rats caught in and about dwellings 42 per cent. harboured fleas, the total being 1,784, the flea index of the whole being thus 4·9, of the infested 11·7 ; 88 per cent. (544) of the second (warehouse) group of 618 had fleas, altogether 8,164, *i.e.*, an index of 13·2 of the whole, 15 of the infested.

In the dwellings 85 per cent. of the fleas were *X. brasiliensis* ; in the warehouses nearly half (46·8 per cent.) were *Ctenopsyllus musculus*. *X. cheopis* was much higher among the warehouse rats [but actual figures are not stated]. *H. H. S.*

KOPSTEIN (Felix). De verspreiding van *Xenopsylla astia* op Java en haar beteekenis voor de epidemiologie der bubonenpest. [*X. astia* **and the Epidemiology of Bubonic Plague in Java.**]—*Geneesk. Tijdschr. v. Nederl.-Indië*. 1932. May 10. Vol. 72. No. 10. pp. 618–633. With 2 maps in text. [41 refs.]

In the coastal zone of Java the author examined the flea population of 974 rats of various species and 275 shrew mice (*Pachyura murina*). He found 2,279 *Xenopsylla cheopis* against 570 *X. astia*. The latter was absent in the south coast ports and on the north coast in Batavia and Pasoeroean. The astia quote was generally 4–24·8 per cent. with two exceptions, 50 and 100 per cent. respectively. Its spread is a very irregular one, which can only be ascribed to sea transport. Its frequency was the same in various species of rats

The natural limitation of explosions of plague in many coastal towns cannot be ascribed to local preponderance of *X. astia*. *W. J. Bais.*

CUMMINGS (Bruce F.) [the late]. **The Bed-Bug, its Habits and Life-History and how to deal with it.** Third Edition. Revised, Enlarged, and Partly Rewritten by Major E. E. AUSTEN, D.S.O. British Museum (Natural History). Economic Series No. 5.—27 pp. With 7 figs. 1932. London: Printed by Order of the Trustees of the British Museum. [2d.]

This edition has been revised, amplified, and furnished with an analytical index. The section on "Bedbugs and Disease" has been rewritten in the light of recent knowledge, the insect being divested of its terrors as a convicted transmitter of disease among mankind, although its mischievous powers in the experimental arena are all recorded. The section on "Remedies," and now entitled "How to Eradicate Bed-bugs," has also been much enlarged and augmented. Here we find besides the simple remedies for allaying irritation caused by its bites, all the sterner methods for destroying the odious creature properly set forth—boiling water; emulsion of kerosine or other similar oils; fumigation with sulphur (3 lb. for each 1,000 c. ft.); various means of overheating infested chambers (to 120°F. or more); formalin vapour (produced by adding chloride of lime to an equal quantity of formalin—in proportion of one lb. of the former to one pint of the latter); HCN gas; and calcium cyanide powder (2 lb. to 1,000 c. ft. of space).

The form and features of the insect are described (and figured); its mouth parts and its manner of sucking blood; its habits, its resistance to starvation and cold, so that it can live (at 60° to 65°F.) for 136 days unfed, and for 9 months after a single feed, and can survive the winter in uninhabited houses despite such starvation; its life history in all its stages from egg onwards and its length of life; its natural enemies; and its zoological affinities and zoological distribution. *A. A.*

GATER (B. A. R.). **Malayan Trombidiid Larvae, Part I. (Acarina: Trombidiidae). With Descriptions of Seventeen New Species.**—*Parasitology.* 1932. June. Vol. 24. No. 2. pp. 143–174. With 16 figs. [51 refs.]

Some salient facts in the history of tsutsugamushi disease and tropical typhus and in the transmission of these diseases to man (from reserves in rats and certain other rodents) by Trombidiid larvae are here reviewed, and 24 species of Malayan Trombidiid larvae that have been found on species of Rattus occurring in Malaya are critically noticed (17 of them being described as new) and severally referred to their host and their provenance. *A. A.*

COLE (A. C.), Jr. **The Olfactory Responses of the Cockroach** (*Blatta orientalis*) **to the More Important Essential Oils and a Control Measure formulated from the Results.**—*Jl. Econom. Entom.* 1932. Aug. Vol. 25. No. 4. pp. 902–905.

For simple practical purposes the olfactory responses—positive, or negative, or indifferent—of the cockroach to 32 essential oils, here tabulated for choice of an ingredient imparting attractiveness to the bait of cockroach-traps, may be interesting and perhaps useful. *A. A.*

SIEMENS (Hermann Werner). Culicosis bullosa. [**Culicosis bullosa.**]—*Arch. Dermat. u. Syph.* 1932. Apr. 22. Vol. 165. No. 2. pp. 490–492. With 1 text fig.

Under this name is described and figured a simple eruption, on the leg of a child, of 2 or 3 distended blisters about the size of a pea and quite free from itching which the author after consideration thinks to be most probably "a non-typical reaction to a gnat-bite." *A. A.*

SODY (H. J. V.). **On** *Crocidura minuta* **Otten and** *Suncus murina* **Linnaeus.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1932. Vol. 21. No. 2. pp. 37–40. [16 refs.]

A long discussion on the questionable validity of the name "*Crocidura minuta*" proposed by OTTEN for a Javan shrew assumed to be new in 1917.

A. A.

CUBONI (E.). Altre ricerche sull'azione tossica della lisocitina e del veleno dei serpenti.—*Boll. Istituto Sieroterap. Milanese.* 1932. Apr. Vol. 11. No. 4. pp. 264–270. German summary. [18 refs.]

HALL (Maurice C.). Parasitology in its Relation to Other Sciences.—*Porto Rico Jl. of Public Health & Trop. Med.* 1932. June. Vol. 7. No. 4. pp. 405–416.

HENRY (Dora Priaulx). Allergy and Immunity in Coccidial Infections.—*Proc. Soc. Experim. Biol. & Med.* 1931. Vol. 28. pp. 831–832.

NAINGGOLAN (F. J.). Nogmaals over de giftigheid van *Naja bungarus* (*N. hannah*).—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1932. Mar. 1. Vol. 72. No. 5. pp. 307–308.

LEPROSY.

KOBAYASHI (Yutaka) & AMAGASAKI (Masao). **Statistical Observations of the Leprosy during 33 Years at the Tokyo Imperial University.**—*Japanese Jl. Dermat. & Urol.* 1932. May. Vol. 32. No. 5. [In Japanese pp. 389–401. With 1 chart. English summary pp. 49–50.]

It is over twenty years since the records of the lepers seen in the dermato-urological clinic of the Tokyo University have been studied. Those of the last 33 years from 1898 to 1930 show 6,693 lepers, or 2·98 per cent. of the total patients seen, with 3·4 times as many males as females. The percentage of lepers was always about 8 up to 1902, but since 1905 it has been only 2 to 3, and as the proportion of lepers among conscripts examined yearly shows no marked change in the last 15 years they conclude that "leprosy in Japan presents no tendency to decay." The ages 21–30 show the highest percentage of cases, namely 39·34; macular cases were 45·47 per cent., nerve 28·05, nodular 13·40, and mixed cases 9·11 per cent. The first signs were noted most frequently on the lower and upper extremities and on the face, and most rarely on the head, neck and nates; abnormal sensations and maculae were the earliest signs. Almost half the cases were in farmers, but this is only in proportion to their numbers.

L. Rogers.

MONIER (H. M.). Évolution d'un foyer de lèpre circonscrit dans la province de Cammon-Laos. [**Development of a Focus of Leprosy in Laos.**]—*Bull. Soc. Méd.-Chirurg. Indochine,* 1932. Apr. Vol. 10. No. 3. pp. 290–304. Also in *Bull. Soc. Path. Exot.* 1932. June 8. Vol. 25. No. 6. pp. 606–617.

Twenty-five years ago 22 lepers were found in two villages in this area and five years ago the number known had increased to 145. A fresh enquiry has now been made and it is stated that the disease was originally introduced from Siam about 70 years ago. Malaria is very prevalent in the district, and among 324 inhabitants examined 43 definite cases and 8 suspected cases of leprosy have been seen, the nerve form predominating. Lepra bacilli were only found in the nasal secretions of 37 per cent. of 51 examined, and 5 times among 8 gland punctures. As the affected villages are isolated the author advises treatment of the cases with precautions against contagion, but compulsory segregation which is of little efficacy should be avoided.

L. R.

LODDER (J.). De lepra te Ambon. [**Leprosy in Amboina.**]—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1932. Vol. 21. No. 1. pp. 41–47. English summary.

"1. The frequency of leprosy has decreased in Amboina during the last nine years. It was 5·5 per thousand inhabitants in 1922 and 4·2 in 1931.

"2. At present there are more lepers in Amboina than formerly, mainly because many of them have come from other islands to the Ambon leper-asylum.

"3. Amongst 105 married couples, in which one of the partners showed leprosy, only in one case the other partner also was a leper.

"4. 3·2 per cent. of the children of leprous fathers and 7·6 per cent. of the children of leprous mothers showed symptoms of leprosy.

"5. The city of Ambon probably is the focus of the disease for the whole island. The differences of leprosy frequency between Mohametans and Christians and in various parts of the island may be explained in this way."

L. R.

LAQUIÈZE (E.). Enquête sur la lèpre aux îles de la Loyauté. [**Leprosy in the Loyalty Islands.**]—*Bull. Soc. Path. Exot.* 1932. May 11. Vol. 25. No. 5. pp. 479–487.

——. La lèpre aux îles de la Loyauté.—*Ibid.* June 8. No. 6. pp. 618–625.

The results of this survey of the prevalence of leprosy in the Loyalty Islands are well summarized in the following table. The figures reveal an increase of leprosy in Lifou, but a fall in Mare Island as compared with previous estimates, but the incidence is still about 3 per cent. of definite cases, and double that figure if suspected cases are included. The percentage of affected women was 45 per cent. in Lifou and Ouvea and no less than 73 per cent. of the total cases in Mare Island—a very high rate, which is attributed to the fact that morality does not exist and women do not know who are the fathers of their children. In two cases infants of two years were infected. Tuberculoid cases are not infrequent. The backwardness of the people makes prophylaxis very difficult, but isolation with treatment of bacteriologically positive

Progress of Leprosy in the Three Isles.

	Year	Population	Lepers	Per cent.	Suspects	Per cent.	Total per cent.
Investigation		Lifou.					
Hébrard	1899		60 to 80	1·15 to 1·42			
,, Nicolas	1907-1908		73	1·26			
	1912	5,500	92	1·67			
,,	1919	5,002	102	3·09	154	2·61	5·70
,, Leboeuf-	1928	5,944	102	3·06	227	3·81	6·87
Javelly	1930	6,150	170	2·76	240	3·90	6·66
	1931	5,859	195	3·31	202	3·44	6·77
Investigation		Mare.					
Hébrard	1899		170	5·05	(Maximum percentage)		
,, Nicolas	1907-1908		106	3·2	(Minimum percentage)		
	1911-1912	3,400	180*	5·29			
,, Lebpeuf-	1929	3,233	90	2·75	69	2·75	5·50
Javelly	1930	3,229	96	2·72	125	3·87	6·59
	1931	3,160	76	2·40	107	3·38	5·79
Investigation		Ouvéa.					
Hébrard	1899		30				
,, Nicolas	1907-1908		39				
Leboeuf-	1912	1,970	56	2·84			
Javelly	1931	1,999	58	2·90	76	3·80	6·70

*Approximate figure.

cases is carried out as far as possible, with good results especially in children, while education in elementary sanitation is attempted. Chaulmoogra esters are used in treatment with 5 per cent. guiacol and this preparation is found to be painless and does not produce reactions.

L. R.

LAMPE (P. H. J.). De organisatie van de leprabestrijding in Suriname. [**Anti-Leprosy Measures in Dutch Guiana.**]—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1932. May 24. Vol. 72. No. 11. pp. 710–720. With 4 figs. on 2 plates. English summary.

On January 1st 1930 a new leprosy ordinance broke the old system of forced segregation by the police and replaced it by medical treatment of non-segregated lepers with the enforcement of precautionary measures to prevent infection, and segregation as a penalty for non-compliance with the regulations. Isolation did not last longer than was necessary on medical grounds, so the institute is now looked on as a hospital from which patients can be discharged to continue treatment at home. The organization includes in its work tracing lepers, treating unsegregated cases, control of patients obeying the medical rules and treatment of cases segregated in infirmaries. School children are examined regularly and those bacteriologically negative taught in a special school and positive cases treated at home or in asylums. There are 1,107 known lepers, of which 482 are isolated in three asylums, 249 attend regularly at the dispensary at Paramaribo and 195 are treated at their homes in the capital and in the districts. *L. R.*

COPANARIS (Ph.). Les progrès effectués en Grèce pendant les deux dernières années dans la lutte contre la lèpre. [**Measures against Leprosy in Greece in the Last Two Years.**]—*Bull. Office Internat. d'Hyg. Publique.* 1932. May. Vol. 24. No. 5. pp. 771–776.

Twenty-five years ago EHLERS found 1,000 lepers in Crete alone, and segregation was commenced in Crete and at Samos and was followed by a decrease of the disease. In 1925 a further inquiry was made and nearly all the lepers discovered were isolated, and during the last two years further efforts resulted in the discovery of 27 new cases and the collection of some 200 into leprosaria for treatment. At the present time 549 are isolated in Crete, Athens, Samos and Chios, including 155 in an infectious hospital at Athens with a laboratory where treatment is carried out with Rogers' Alepol. Reactions occur and the results are very satisfactory. *L. R.*

COCHRANE (R. G.). **A Survey of the Modern Development of Leprosy Work (1917–31), with an Appreciation of the Present Position.**—*Brit. Jl. Dermat. & Syph.* 1932. Mar. Vol. 44. No. 3 (No. 521). pp. 132–140. [23 refs.]

In this brief account of the well known recent history of leprosy work three periods are marked off, that up to 1916 or 1917, that from 1917 to 1931, and that after the international conference in 1931. A small, but rather important, chronological error has crept into the sentence: "The first work of Heiser, Mercado, Hollmann and Dean, followed up a year or two later by Rogers, on the discovery of preparations which

are capable of being given by injection." [A reference to the full account of the discovery of the modern methods of treatment will be found in ROGERS' Cameron Prize Lecture of October 1929, with 88 references, published in the *Edinburgh Medical Journal*; from this it will be seen that HOLLMANN and DEAN, in their important paper on the injection of chaulmoogra esters, published June 1919, acknowledged fully the earlier work of ROGERS published in 1916 and 1917 which established the value of the injection of soluble products of chaulmoogra oil. HEISER and MERCADO had previously injected the whole oil.]

L. R.

WADE (H. W.). **Demonstration of South African Tuberculoid Leprosy.** —*Proc. Roy. Soc. Med.* 1932. May. Vol. 25. No. 7. pp. 1023–1027 (Sect. of Dermat. pp. 47–51). With 2 text figs.

The author found the tuberculoid type of macular leprosy unusually common in South Africa. It is characterized by a degree of infiltration raising the lesions abruptly above the surrounding skin, a rough granular surface and on microscopic examination lepra bacilli are very scarce, but giant cells resembling those of tuberculosis are met with. Two illustrations of the appearance of the lesions are included. *L. R.*

SOULAGE & NADESSIN. Lèpre cutanée éruptive varicelliforme. [**Varicelliform Eruption in Leprosy.**]—*Rev. Méd. et Hyg. Trop.* 1932. Mar.–Apr. Vol. 24. No. 2. pp. 102–106. With 2 text figs.

A case of leprosy is described in which numerous vesicles about the size of a lentil appeared on the body, and on microscopical examination they showed numerous acid-fast bacilli, which were also found in the nasal secretion. *L.R.*

BARRETT (J. W.). **Paralysis of the Lower Eyelid due to Leprosy.** [Correspondence.]—*Med. Jl. Australia.* 1932. July 30. 19th Year. Vol. 2. No. 5. p. 155.

The writer reports that in Honolulu isolated paralysis of the lower eyelid, due to affection of facial nerve fibres, is common. On the other hand he has never seen involvement of the intrinsic muscles of the eye in leprosy. *L. R.*

MUIR (E.) & CHATTERJI (S. N.). **The Infection of Stratified Epithelium in Leprosy.**—*Indian Jl. Med. Res.* 1932. Apr. Vol. 19. No. 4. pp. 1163–1164. With 4 figs. (2 coloured) on 3 plates.

The authors report a case of suspected ichthyosis in which skin clips revealed numerous lepra bacilli and sections showed numerous similar bacilli in the more superficial parts of the corium. Superficial scrapings of the epithelium from various parts of the body also occasionally showed numerous acid-fast bacilli, so that the organisms must have been frequently shed from the unbroken skin. Scrapings in several other patients with intact epithelium have yielded similar findings, so the possibility of infection in the absence of ulceration of the skin must be recognized. *L. R.*

LEGER (Marcel). Procédé commode de mise en évidence des bacilles de la lèpre. [**Convenient Procedure for demonstrating Lepra Bacilli.**]—*Bull. Soc. Path. Exot.* 1932. June 8. Vol. 25. No. 6. pp. 546–549.

The author points out that the " clip-method " for detecting lepra bacilli in the skin recently described by LOWE and CHRISTIAN is practically identical with that described by Leger in his article on leprosy in CARNOT & LEREBOULET's Treatise of Medicine. In his plan a small triangular piece of tissue, not extending into the subcutaneous tissues, is dissected up and its under surface applied to a clean slide, after which the piece of tissue is replaced and heals without leaving even a superficial wound. *L. R.*

SARDJITO (M.) & SITANALA (J. B.). [In Dutch & English.] Het aantoonen van leprabacillen in het bloed door middel van de dikkedruppelmethode. **The Demonstration of Lepra Bacilli in the Blood by Means of the Thick Drop Method.**—*Meded. Dienst d. Volksgezondheid in Nederl.-Indië.* 1932. Vol. 21. No. 2. In Dutch pp. 27–32. In English pp. 32–37. With 6 figs. on 1 plate.

The authors have confirmed the possibility of finding lepra bacilli in the blood of lepers by the thick drop method, as used in malaria, and, after dehaemoglobinization and drying, staining with the Ziehl-Neelsen method. The blood was taken from a healthy looking finger after cleaning with ether and alcohol. In 33 untreated patients the nasal secretion gave 26, irritation serum 25 and blood drops 25 positive results, and in 19 treated ones the figures were 12, 12 and 15 respectively. Out of 129 apparently healthy house-mates of lepers the nasal secretion was positive in 4, irritation serum in 1 and blood drops in 6, and they give reasons for considering that there is the highest probability that these acid-fast bacilli were lepra. The morphology of the bacilli varied greatly from globi consisting of masses of bacilli to separate rods and cocco-bacilli. These are illustrated by micro-photos. *L. R.*

MONTEL (M. L. R.). Quelques considérations sur le traitement de la lèpre. [**Treatment of Leprosy.**]—*Bull. Soc. Path. Exot.* 1932. May 11. Vol. 25. No. 5. pp. 404–410.

The author records his experience in Saigon in the treatment of leprosy which he holds cannot now be considered incurable, if chaulmoogra preparations are injected over a long period. In early cases with the first lesions clinical cure can be obtained, and in generalized cases either disappearance of the symptoms or their great amelioration may result. Pilules of chaulmoogra soaps can also be used orally with benefit, but should be supplemented by injections of collobiase chaulmoogra. *L. R.*

POTTIER (R.). Note au sujet des médicaments dérivés de l'huile de chaulmoogra, utilisés contre la lèpre. [**Derivatives of Chaulmoogra Oil in Leprosy.**]—*Ann. Soc. Belge de Méd. Trop.* 1932. June 30. Vol. 12. No. 2. pp. 143–145.

In this short paper the author states his preference for chaulmoogra esters, with either ½ per cent. iodine or 10 per cent. creosote, from the point of view of tolerance, but he advises that the soaps should also be tried. *L. R.*

RAO (G. Raghunatha). **Studies on Serum Proteins in Leprosy, with Special Reference to Hydnocarpus Treatment.**—*Indian Jl. Med. Res.* 1932. Apr. Vol. 19. No. 4. pp. 993–1011. With 2 graphs.

In reviewing papers on the increase in the serum-globulin in lepers ROGERS suggested that the simple formol-gel test might possibly prove of diagnostic value, so the author has studied the serum proteins in 252 cases of leprosy, with 56 controls, with special reference to hydnocarpus treatment. He found a significant reduction in serum albumin and increase in serum globulin in all types of lepers and in untreated ones, and a marked increase of the globulin value follows an injection of any hydnocarpus preparation. On the other hand the formaldehyde test in uncomplicated leprosy is never positive and there is no definite relationship between formalin coagulation and serum globulin in lepers or lepra reaction. *L. R.*

NOLASCO (J. O.). **Lymphatic Absorption of only Antileprotic Drugs, given Intradermally and Subcutaneously ; a Demonstration.**—*Jl. Philippine Islands Med. Assoc.* 1932. Apr. Vol. 12. No. 4. pp. 147–159. With 4 text figs. [17 refs.]

Experiments to establish the route of absorption of chaulmoogra oil and ester subcutaneous and intradermal injections were carried out in four monkeys with control injections of salt solution in the opposite limbs. After death from tuberculosis in one and sacrifice of the other animals, microscopic examinations of the tissues were made and the sections stained to show the absorption of the fatty substances injected at intervals of 7 to 16 days during the previous five weeks. It was found that the injected oily substances were absorbed by the lymphatics where they would come into direct contact with the lepra bacilli. The intradermal method caused greater fatty infiltration of the corium than did the subcutaneous, so the former appears to be preferable. The iodized ethyl esters caused more cellular infiltration of the injected skin than the oil, so the former is more active. The drug was found in the lymphatic glands and also in large mononuclear cells in the lungs, and more rarely in the spleen, but not in the liver or kidneys. The ulnar and median nerve trunks were unaffected by injections of the drug into the forearm. *L. R.*

BHANDARI (Amba Datt). **Alepol in the Treatment of Leprosy.**—*Indian Med. Gaz.* 1932. May. Vol. 67. No. 5. pp. 244–246.

The author reports that as the result of a year's trial of alepol intramuscularly and subcutaneously at a leprosy clinic he has found it to be well tolerated and to cause less irritation than E.C.C.O. and other hydnocarpus preparations, while it is comparatively cheaper. *L. R.*

STEIN (A. A.). Zur Therapie der Lepra. [**Treatment of Leprosy.**]—*Dermat. Ztschr.* 1932. May. Vol. 63. No. 6. pp. 393–401.

This paper deals with the local and temperature reactions in the course of the treatment of leprosy. Such exacerbations come on quite suddenly with inflammatory appearances in the skin lesions and nerve pains, swelling of the lymphatic glands and fever with temperature rises up to 39–40°C. and sometimes the appearance of new skin lesions,

and they are commonly followed by clinical improvement. They are relieved by the intravenous injection of tartar emetic in doses of 1–5 cc. of a one per cent. solution every two days, with rapid subsidence of the local and febrile reactions. On the other hand in stationary cases of leprosy antimony had no effect, nor does its use protect against the recurrence of exacerbations. *L. R.*

STEIN (A. A.). [**Antimony Treatment of Exacerbations in Leprosy.**]—*Trop. Med. & Vet.* Moscow. 1931. Vol. 9. No. 9. pp. 442–446. [In Russian. French summary.]

The author employed 1 per cent. tartar emetic intravenously in doses of 1 to 5 cc. every other day for the treatment of exacerbations in leprosy. The exacerbations dealt with were characterized as follows: increase of the inflammatory processes in existing nodules, appearance of new nodules, rise of temperature to 40°C., and other minor symptoms. Antimony treatment causes a rapid fall in the temperature, a sharp diminution of the inflammation of the nodules and a gradual disappearance of the new ones. It is effective only in acute cases, but does not protect from recurrences of exacerbations. *C. A. Hoare.*

ADANT (M.). Au sujet de la réaction de Rubino. [**Rubino's Reaction.**]—*C. R. Soc. Biol.* 1932. May 20. Vol. 110. No. 17. pp. 119–120.

The author has used Rubino's test, which consists in the sedimentation of haemolysed sheep's red corpuscles by the serum of a leper, and he has confirmed Rubino's finding that non-specific reactions under the influence of hetero-agglutinins in the non-leprous can be avoided by their previous absorption by non-formalized red corpuscles. *L. R.*

LÉPINE (P.), MARKIANOS (J.) & PAPAYOANNOU (A.). Valeur pratique de la réaction de Rubino pour le sérodiagnostic de la lèpre. [**Practical Value of Rubino's Reaction in the Serodiagnosis of Leprosy.**]—*Bull. Soc. Path. Exot.* 1932. June 8. Vol. 25. No. 6. pp. 543–546.

These workers also confirm the specific value of Rubino's test used with the absorption of hetero-agglutinins when necessary. They have studied its degree of sensibility in different stages of the disease with the result that in first stage cases only 50 per cent. were positive against 70 to 77 per cent. in the second and third stages. Further positive reactions were obtained in 12·5 per cent. of nerve, 35 of mixed, 14 in early macular and 70 per cent. of nodular cases. The positive cases were well marked clinically, so its diagnostic value is very limited. *L. R.*

COWAN (T. A.). **The Wasserman Reaction in Leprosy.**—*Malayan Med. Jl.* 1932. June. Vol. 7. No. 2. pp. 46–48.

The claim of KOLMER that his modification of the Wassermann test does not give falsely positive reactions in non-syphilitic lepers has been tested in 593 Malay Asylum lepers showing no signs of syphilis and in 444 non-leper controls. Anticomplementary cases amounted to 3·8 per cent. in advanced lepers, 1·1 per cent. in others and 1 per cent. in controls, and they were excluded. In the remainder the Kolmer test gave positive reactions in 35·9 per cent. of the controls, 31·5 of early

cutaneous and mixed cases, 30·7 in pure nerve cases other than the advanced ones, 38·5 in moderately advanced cases and advanced nerve ones and 53·9 per cent. of advanced cutaneous and mixed cases, so the test is not very reliable in the last mentioned class. *L. R.*

PINOY (E. P.) & FABIANI (G.). Essai négatif d'inoculation de la lèpre chez un singe splénectomisé. [**Negative Result of Inoculation of Leprosy into a Splenectomized Monkey.**]—*C. R. Soc. Biol.* 1932. June 17. Vol. 110. No. 21. pp. 489–490.

A monkey, *Macacus inuus*, was splenectomized with a view to decrease its resisting power, and then inoculated intraperitoneally with the juice obtained by puncturing an inguinal gland of a leper. The result was negative. *L. R.*

WATANABE (Yoshimasa), HARASAWA (Jinsai) & ONO (Isamu). **On the Isolation of Acid-fast Bacilli from the Leprous Nodules and Animal Experiments.**—*Kitasato Arch. Experim. Med.* 1931. July. Vol. 8. No. 3. pp. 303–313.

After brief reference to some former attempts to cultivate the lepra bacillus these authors report that after many years work at the subject they succeeded in obtaining pure cultures of two acid-fast bacilli. One gave a brownish-yellow colony like that described by CLEGG, and the other a pale colony resembling the colonies of tubercle bacilli described by KEDROWSKY. Yolk of egg agar was the most successful culture medium in the case of the brownish-yellow colonies, and inoculation into rats and guineapigs gave negative results, so they are doubtful whether it is the lepra bacillus or only a contamination. The pale colonies grew only in a vegetable soup made with Japanese carrots, and subcultures could only be made after incubation for over two weeks. The organisms could be stained with Ziehl-Neelsen or gentian violet and they were gram positive. Inoculation of guineapigs and mice gave negative results, but in a Japanese monkey nodules which ulcerated formed at the three sites of inoculation ; subcultures, however, were not successful. On inoculating the monkey with tuberculin allergy was obtained. They do not think that the pale colonies can be considered to be lepra bacilli because the percentage of cultivation was very small and animal experiments were negative. *L. R.*

JAME (L.), JACOB (A.) & JUDE (A.). Lèpre mixte à évolution aiguë. (Présentation de malade.)—*Rev. Méd. et Hyg. Trop.* 1932. May-June. Vol. 24. No. 3. pp. 149–153. With 2 figs.

MONTAÑÉS (Pablo). La reacción de Rubino en la lepra. Su valor diagnóstico.—*Rev. Sanidad e Hig. Pública.* 1932. Jan. Vol. 7. No. 1. pp. 1–25. With 7 diagrams. [15 refs.]

TANCREDI (Antonio). Ricerche sopra il sangue di lebbrosi prima e dopo la cura Simonini.—*Arch. Ital. Sci. Med. Colon.* 1932. July 1. Vol. 13. No. 7. pp. 393–417. With 2 figs. & 2 coloured plates. [42 refs.] English summary (6 lines).

MEDICAL ZOOLOGY.

Venomous Snakes and Snake Venoms.

1. *Snake-venom and Snakebite.*—Kellaway[1] describes the effects of the certainly lethal dose of the venom of the Common Australian Brown Snake, *Demansia* [sic] *textilis*, for an extensive series of laboratory animals. The venom although highly potent is somewhat inferior to that of the Tiger Snake ; it is powerfully neurotoxic, little haemolytic, and its thrombin component is very potent both *in vivo* and *in vitro*. The amount of the venom-yield and the skeletal biting-mechanism are not ideally effective for the destruction of man.

Hara[2] reports his experimental studies of biochemical changes in the blood and of the histopathology of the skin caused by the haemorrhagic venoms of three Formosan snakes—*Lachesis gramineus* and *mucrosquamatus* and *Ancistrodon acutus*. He concludes that the haemorrhage caused by them is due to destruction of the vascular endothelium and not directly to changes in the blood, and also that the ultimate anaemia is both haemorrhagic and toxic.

Iswariah and David[3] go into the pharmacological effects of the venom of the Oriental *Vipera Russellii*. They conclude that the general fall of blood-pressure caused by it in mammals is probably due to paralysis of the capillaries ; that it does not seem to have any direct action upon the heart or the walls of the bloodvessels ; they observe that intravenous administration of normal saline in 10 to 15 cc. doses tends to revive the animal, the heart working well for a long time afterwards ; and they do not find any evidence that the venom increases the coagulability of the blood, or that haemolysis is caused by any concentration likely to be found in the human system after a bite from a viper.

Treatment of Snakebite.—The excellent dissertation by Kellaway and Morgan[4] on the treatment of snakebite in Australia may be regarded as the practical outcome of the revival of research started mainly by Fairley and Kellaway and already noticed in this *Bulletin* for 1929 (Vol. 26, pp. 770–776). For the rational treatment of snakebite Australia is now restored to its proper place in the front line.

Other papers on treatment are not of any special interest. Manon[5] includes details of two cases of viper-bite in Europe in a general review

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[1] Kellaway (C. H.). Observations on the Certainly Lethal Dose of the Venom of the Common Brown Snake (*Demansia textilis*) for the Common Laboratory Animals.—*Med. Jl. Australia.* 1931. Dec. 12. 18th Year. Vol. 2. No. 24. pp. 747–751.

[2] Hara (Y.). Experimental Studies on the Poisons of Formosan Snakes. (3rd Report.) On the Patho-Histological Changes of the Skin caused by the Poisons. (4th Report.) On the Origin of the Haemorrhage caused by the Haemorrhagic Poisons. (5th Report.) On the Origin of the Anaemia caused by the Haemorrhagic Poisons.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1932. Apr. Vol. 31. No. 4 (325). [In Japanese. English summaries pp. 45–46.]

[3] Iswariah (V.) & David (J. Christodoss.) The Pharmacological Action of the Venom of Russell's Viper of India (Daboia or *Vipera elegans*).—*Indian Jl. Med. Res.* 1932. Apr. Vol. 19. No. 4. pp. 1035–1040. With 6 figs.

[4] Kellaway (C. H.) & Morgan (F. G.). The Treatment of Snake-Bite in Australia.—*Med. Jl. Australia.* 1931. Oct. 17. 18th Year. Vol. 2. No. 16. pp. 482–485.

[5] Manon. Deux cas de piqûre de vipère. Etude sur les piqûres des reptiles venimeux en général.—*Jl. Méd. de Bordeaux.* 1932. May 10. Vol. 109. No. 13. pp. 369–375. With 15 figs.

on venomous reptiles. GHARPUREY[6] in recalling some recorded cases of treated bites from krait, cobra, and *Echis carinatus*, calls attention to the fact that the bite of the harmless *Lycodon aulicus*—a common Indian snake that is often mistaken for a krait—may evoke some transient local irritation. KOPSTEIN[7] describes *Bungarus javanicus* as a new species of krait from Java, its effective bite being quickly fatal, with dyspnoea as the urgent symptom. There only remains to mention a paper by SEAL[8] on cases in Bengal of what the author calls progressive peripheral neuritis following snakebite. In the accounts of these cases the mention of a tight ligature applied as a "first aid measure" and kept in place for many hours has an ominous significance.

2. *Immunology.*—Experiments by GUNN and HEATHCOTE (see this *Bulletin*, 1921, Vol. 18, p. 31) were interpreted by those workers as evidence that both the *natural* resistance and the *acquired* immunity of the cat to cobra-venom are due, at least in part, to the activity of the animal's tissue-cells. The experiments now recorded by KELLAWAY and WILLIAMS[9] although to a certain extent considered confirmatory of that interpretation are held to be inconclusive evidence as to *acquired* cellular immunity, these authors having no faith in the acquirement of immunity by the tissues apart from that conferred by the presence of antitoxic antibody in the tissue-cells or the intercellular spaces.

Investigations by IWASE[10] of the immunizing properties of the anti-venomous sera of five species of Formosan thanatophidia—namely *Lachesis mucrosquamatus*, *L. gramineus*, *Ancistrodon acutus*, *Naja naja atra*, and *Bungarus multicinctus*—possess some interest, and the following results are published in the German summary of that author's paper. Antimucrosquamatus serum could partly neutralize the Bungarus venom, but antigramineus serum could not do so; conversely the antibungarus serum can to a certain—if small—extent neutralize *Lachesis mucrosquamatus* and *L. gramineus* venom. Polyvalent serum against the venom of *Ancistrodon acutus* and *Lachesis mucrosquamatus* and *gramineus* can immunize animals against the venoms of *A. acutus* and *L. mucrosquamatus* and contains a sufficiency of antitoxin against *L. gramineus* venom. The polyvalent serum against venom of *Naja naja atra* and *Bungarus multicinctus* is of great consequence practically but has no peculiar immunological interest. The venoms of the three viperid species have certain properties in common, those of the two colubrine species have not. A somewhat similar paper by

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[6] GHARPUREY (K. G.). Some Snake-Bite Cases.—*Indian Med. Gaz.* 1932. Feb. Vol. 67. No. 2. pp. 81–82.

[7] KOPSTEIN (Felix). *Bungarus javanicus*, een nieuwe Javaansche giftslang. Mededeeling over een doodelijke Bungarus-beet.—*Geneesk. Tijdschr. v. Nederl.-Indië.* 1932. Feb. 2. Vol. 72. No. 3. pp. 136–139. With 1 fig. & 1 plate.

[8] SEAL (S. C.). Snake Bite and Neuritis.—*Calcutta Med. Jl.* 1931. Nov. Vol. 26. No. 5. pp. 185–195.

[9] KELLAWAY (C. H.) & WILLIAMS (F. Eleanor). Some Observations on Cellular Immunity to Snake Venom.—*Jl. Path. & Bact.* 1932. Mar. Vol. 35. No. 2. pp. 193–197.

[10] IWASE (Y.). Immunologische Untersuchungen ueber die wichtigeren Schlangengifte in Formosa. I. Bericht: Quantitative Beziehungen zwischen den Schlangengiften und Immunseren. II. Bericht: Immunologisch gemeinschaftliche Eigenschaften der Schlangengifte.—*Taiwan Igakkai Zasshi* (*Jl. Med. Assoc. Formosa*). 1931. Dec. Vol. 30. No. 12 (321). [In Japanese. German summaries pp. 93–95.]

SCHLOSSBERGER and MENK[11] on the extra-specific valency of anti-venomous sera is mostly ratiocinatory ; its experimental contribution is summarized in 3 tables which record the neutralizing effect of definite quanta of several of the standard antivenomous snake-serums on definite quanta of the venoms of certain species of European vipers—in admixture and injected into mice.

Madame PHISALIX and F. PASTEUR[12] describe the technique and the experiments which lead them to the conclusions that the infra-red rays like the ultra-violet rays do not modify the global toxicity of viper-venom, but that they only partially destroy its venom-antigen (slightly diminishing its vaccinating action) which the ultra-violet rays destroy completely. Madame PHISALIX[13] under the subheadings "Vaccination against viper-venom by means of bee-venom" and "Vaccination against bee-venom by means of viper-venom" describes her experiments which confirm and verify those of C. PHISALIX (*C. R. Soc. Biol.* 1897, Vol. 49, p. 1031) demonstrating the antagonism between the venom of the Vespidae and that of the viper, the former imparting some amount of immunity against the latter. See also on this reciprocal phenomenon *C. R. Acad. Sci.* 1904, Vol. 139, p. 326, "Researches on Venom of Bees."

3. *Anavenins and Paravenins.*—The excellent series of papers by ARTHUS on Anavenins has been noticed elsewhere in this *Bulletin* (Vol. 28, pp. 549, 550 ; and Vol. 29, pp. 161, 492). We may, however, invite attention to the sixth instalment[14] of the series, which deals briefly with paravenins or solutions of snake-venom neutralized not by treatment with formaldehyde but by treatment with 2 per cent. chloride of lime. A 1 per cent. solution of cobra-venom so treated is neutralized "practically instantaneously" (although about $\frac{1}{100}$th part of the venom remains for an indefinite time unaltered) ; all its toxic properties, paralytic, anticoagulant, and proteolytic, are suppressed. So too is it with the venoms of *Crotalus adamantus* and *Lachesis lanceolatus* similarly chlorinized. Therefore, as CALMETTE has stated, venomous snakebite may well be treated by injection of the appropriate paravenin into the vicinity of the bite, but not into any other part of the body.

A. Alcock.

MALLICK (S. M. K.) & MAITRA (G. C.). On the Distribution of Protective Principle in Different Protein Fractions of Horse Serum immunized against Snake Venom.—*Indian Jl. Med. Res.* 1932. Jan. Vol. 19. No. 3. pp. 951-955. [10 refs.].

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[11] SCHLOSSBERGER (H.) & MENK (W.). Experimentelle Untersuchungen ueber die Serumbehandlung der Bisse europäischer Giftschlangen.—Reprinted from *Festschrift für Prof. Dr. Emil Bürgi, Bern.* 1932. p. 296. [11 refs.] in *Arb. a. d. Reichsgsndhtsamt.* 1932. May. Vol. 56. No. 1. pp. 1–11.

[12] PHISALIX & PASTEUR (F.). Les rayons infra-rouges ne modifient pas la toxicité globale du venin de la vipère aspic, mais en diminuent légèrement l'action vaccinante.—*Bull. Soc. Path. Exot.* 1932. Apr. 13. Vol. 25. No. 4. pp. 320–322.

[13] PHISALIX. Action vaccinante réciproque des venins d'abeille et de vipère aspic.—*Bull. Soc. Path. Exot.* 1932. June 8. Vol. 25. No. 6. pp. 581–584.

[14] ARTHUS (Maurice). Les anavenins (sixième mémoire). Destruction de la toxicité des venins par le chlorure de chaux. [The Anavenins (Part 6). Destruction of the Toxicity of Venoms by Chloride of Lime.]—*Jl. Physiol. et Path. Gén.* 1931. Dec. Vol. 29. No. 4. pp. 705–716.

TROPICAL OPHTHALMOLOGY.

A REVIEW OF RECENT ARTICLES. XVIII.*

CONJUNCTIVA.—*Plasmoma of the conjunctiva* is a condition which, possibly, may sometimes escape recognition in trachomatous countries. SOUDAKOFF[1] has presented a careful clinical and histological account of the disease based on the study of seventeen cases amongst Chinese patients of varying age and class. The disease had a gradual onset. A small reddish granular mass appeared, most frequently in the plica semilunaris, but sometimes in the retrotarsal fold. Multiple masses might closely resemble trachomatous follicles. Adjacent masses coalesce and have a yellowish-red waxy appearance with a smooth surface and a firm consistency. The surface may become lobulated and these lobules are smooth and pale with an absence of blood-vessels and are unaccompanied by any discharge. Histologically there is a diffuse infiltration of plasma cells which begins just beneath the epithelium ; hyaline degeneration of the connective tissue stroma can be detected in most cases. Plasmoma is not a tumour but a reaction to a chronic irritant. The author believes that trachoma plays an important part in the development of the disease. Prolonged action of the toxin irritant may lead to advanced hyaline and amyloid degeneration of the connective tissue. Early and complete excision of the growth followed by radium treatment are the measures recommended for cure.

Another form of conjunctival inflammation likely to be confused with trachoma is described by KELLER[2] who met with it in Saigon. The palpebral conjunctiva is much thickened and papillary formation is marked. There is considerable engorgement of the vessels of both bulbar and tarsal conjunctiva, and chemosis is often present. With suitable treatment resolution occurs without any cicatrization in about three weeks. Corneal ulcers may form occasionally. The disease always first attacks the tarsal conjunctiva of the lower lid and may remain limited to one eye, differing from trachoma in these respects. Lachrymation is profuse, but there is no mucopurulent discharge. Great care should be exercised to avoid the use of any irritating applications in the early stages of the disease. Once the swelling has subsided sulphate of zinc and atropine are useful. The inflammation appears to be contagious, but no organism has been isolated. The disease rather resembles swimming-bath conjunctivitis, but has no connection with bathing.

Trachoma.—TIROUVANZIAM & LÊ-VAN-XUYÊN[3] have remarked that, though trachoma is widespread in Indo-China, Cambodia is relatively free from the disease, The province of Kampot is, however, heavily infected. This is due to the constant influx of trachomatous immigrants from China. The sufferers take little care of themselves and the disease spreads. The authors describe their methods of

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* For the seventeenth of this series see Vol. 29, pp. 434-440.

[1] SOUDAKOFF (P. S.). Plasmoma of the Conjunctiva in China.—*China Med. Jl.* 1930. Mar. Vol. 44. No. 3. pp. 195–225. With 14 figs. (1 coloured) on 7 plates. [56 refs.]

[2] KELLER (P.). Contribution à l'étude d'une nouvelle forme de conjonctivite : la conjonctivite hypertrophique.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1932. Apr. Vol. 10. No. 3. pp. 305–313.

[3] TIROUVANZIAM & LÊ-VAN-XUYÊN. Le trachome à Kampot.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. Nov.-Dec. Vol. 9. No. 10. pp. 789–794.

treatment which are those in common use. CORNET[4] has found tracholysine to be excellent in the treatment of the disease, especially in its early stage. He claims that it is painless and can be used in association with other measures.

In the *Revue Internationale du Trachome* for April 1932 SANTONASTASO[5] describes degenerative changes in the tarsal conjunctiva of the lower lid and in the bulbar conjunctiva which he believes were caused by trachoma. GABRIÉLIDÈS[6] reviews the knowledge of trachoma possessed by the ancient Greeks. A perusal of his paper is calculated to increase one's admiration for that people. Thus ARISTOTLE recognized that a sound knowledge of the workings of the body in health and disease was required of any person who attempted to cure diseases of the eye. GALEN thought that trachoma could originate not only from evil humours in the body or from the use of irritating applications, but also from ordinary sources of conjunctival inflammation such as dust, smoke, irritating vapours, etc.

WRIGHT[7] has found the use of a contact glass helpful in maintaining a conjunctival flap or graft in the desired position on the cornea. He has reported a very satisfactory result in the case of a corneal fistula which followed an ulcer in the pupillary area. Thin epithelial grafts, taken from the arm, and applied under the protection of a contact glass also gave excellent results.

Cataract.—A paper by ELLIOT[8] is full of practical hints regarding the management of cataract cases. He does not hesitate to operate on a mature uncomplicated cataract when the other eye has normal vision, since he considers that the advantages of so doing outweigh any disadvantages. He prefers usually to perform a preliminary iridectomy and about a month later to extract the cataract under a bridge-flap of conjunctiva. A central piece of the anterior layer of the capsule is excised with a Bowman's needle before making the section; after the lens has been delivered cortical matter is washed out of the chamber and the toilet of the wound is completed by a stream of normal saline solution. [It may be noted that this author was the first to apply the use of McKeown's irrigation of immature cataracts in the ordinary operation and to develop it.] The paper is largely concerned with European practice, but will nevertheless prove of much service to the surgeon working in the Tropics. JAMAL-UD-DIN[9] has recorded some notes on his experience of cataract in the Punjab. Smith's intracapsular operation is that most often performed, and a corneal incision is favoured. The after-treatment includes complete rest in bed

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[4] CORNET (Emmanuel). Deux cas de trachome cliniquement guéris par injections sous-conjonctivales palpébrales de tracholysine d'Angellucci.—*Bull. Soc. Méd.-Chirurg. Indochine.* 1931. Nov.-Dec. Vol. 9. No. 10. pp. 813–815.

[5] SANTONASTASO (A.). Contributo allo studi del tracoma come causa di degenerazione dei tessuti attaccati.—*Rev. Internat. du Trachome.* 1932. Apr. Vol. 9. No. 2. pp. 67–83. With 5 figs. French summary.

[6] GABRIÉLIDÈS (A.). Du trachome et du trichiasis chez les anciens Grecs.—*Rev. Internat. du Trachome.* 1932. Apr. Vol. 9. No. 2. pp. 95–112. [39 refs.]

[7] WRIGHT (R. E.). The Contact Glass as an Aid in Corneal Plastic Surgery.—*Brit. Jl. Ophthalm.* 1932. Aug. Vol. 16. No. 8. pp. 473–475.

[8] ELLIOT (R. H.). Cataract.—*Practitioner.* 1932. May. Vol. 128. No. 5. pp. 481–492. [10 refs.]

[9] JAMAL-UD-DIN. Notes on Cataract in the Punjab.—*Indian Med. Gaz.* 1932. July. Vol. 67. No. 7. pp. 386–387.

for a period of from seven to ten days. The author prefers to leave the dressings undisturbed until the tenth day; but he admits that such restriction may not be essential to success.

UBALDO and AYUYAO[10] found that cataract accounted for seventeen per cent. of the 3,748 patients who attended the Eye Department of the Philippine General Hospital during ten years. The labouring class seemed to show a higher incidence of the disease than the well-to-do, a difference in nutrition being possibly the determining factor. Intracapsular extraction was the operation performed on all the senile cataracts. The rate of vitreous escape was approximately ten per cent. and of intraocular haemorrhage one per cent. The occurrence of vitreous opacities after operation was somewhat frequent. The authors believe that disuse of the eye owing to delay in seeking relief prejudices the prospect of recovering good vision; and better results are likely when patients become sufficiently enlightened to seek aid earlier.

Quinine Poisoning.—ROQUES[11] has reported a case of quinine amblyopia. The patient was a youth who claimed to have swallowed twenty-two and a half grams of quinine. Deafness and blindness followed. The pupils were dilated and inactive and the vision was reduced to perception of light. The optic disc was blanched and the fundus reflex grey with a rose coloured area in the macular region whilst the retinal arteries appeared shrunken. Central vision recovered to 9·10 after the lapse of a month and a half, but the visual field remained concentrically contracted. Pallor of the disc and a sluggish pupil reaction also persisted. The ophthalmoscopic picture during the active stage closely resembled that of an obstruction of the central artery of the retina, but in this case both eyes were affected and the discs were more blanched than in the latter condition.

Filariasis.—Koman NAYAR & Kandaswami PILLAI[12] have reported a case of a filarial worm in the eye and believe the invader to have been an adult *F. bancrofti*. The patient came from a district in which filariasis is prevalent and his blood contained microfilariae bancrofti; the worm, too, when seen in the anterior chamber, resembled *F. bancrofti*. When first seen the parasite lay wriggling in the vitreous, one extremity being attached to a small clot of blood in the neighbourhood of the macula. During a railway journey of about 400 miles to Madras the patient was conscious of red and green sparks passing in front of his eye and on arrival at his destination the worm had disappeared. Five days later it reappeared and was found lying at the bottom of the anterior chamber from which it was evacuated but was unfortunately lost in the gush of aqueous. It should be noted that any bright light thrown on the worm during examination rendered it restless and uneasy.

Leprosy.—BARRETT[13] has drawn attention to the paralysis of the lower eyelid which is not uncommonly found in the comparatively

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[10] UBALDO (A. R.) & AYUYAO (C. D.). Cataract among Filipinos.—*Jl. Philippine Islands Med. Assoc.* 1932. Apr. Vol. 12. No. 4. pp. 160–163.

[11] ROQUES (Paul). Troubles oculaires consécutifs à une intoxication par la quinine.—*Marseille-Méd.* 1931. Nov. 25. Vol. 68. No. 33. pp. 675–677.

[12] NAYAR (K. Koman) & PILLAI (A. Kandaswami). A Case of Filariasis Oculi.—*Brit. Jl. Ophthalm.* 1932. Sept. Vol. 16. No. 9. pp. 549–551.

[13] BARRETT (J. W.). Paralysis of the Lower Eyelid due to Leprosy. [Correspondence.]—*Med. Jl. Australia.* 1932. July 30. 19th Year. Vol. 2. No. 5. p. 155.

early stages of leprosy. The facial nerve may be involved either as a whole or in its various terminal branches.

The Annual Report of the Madras Government Ophthalmic Hospital for the year 1931[14] is rather a special number since, unfortunately, it is likely to be the last to be issued by the Superintendent, Lt.-Col. R. E. WRIGHT, as he is leaving India on his retirement. He has furnished a very comprehensive account of the Hospital and its activities. The Institution has now reached a very considerable size and deals with nearly four thousand in-patients and twenty-nine thousand out-patients annually. The daily attendance of out-patients exceeds 300, and operations on in-patients amount to nearly 3,600 (1,816 being for senile cataract). Post-graduate training, too, is actively pursued in this well-equipped school. The record of Wright's great experience in cataract extraction is extremely valuable. Regarding technique he remarks "Every case is a law unto itself, and one must be quick to appreciate how to vary procedure according to the nature of the case, and to anticipate probable trouble during the convalescence." A tendency to ocular hyperaemia is common in Madras patients and this often causes bleeding to occur into the anterior chamber, with consequent complications, when a "bridge-flap" is fashioned. An open mind is preserved on the question of capsulotomy or intra-capsular extraction. Barraquer's phakoerisis was the variety of intra-capsular operation most often performed (193 eyes); but over eighty per cent. of the extractions were by capsulotomy and the majority of these had a peripheral iridectomy. Vitreous escape occurred in 1·25 per cent. and iris prolapse in 0·66 per cent. These figures are remarkably low since different surgeons of varying experience were responsible. As regards the cause of glaucoma secondary to a hypermature cataract Wright considers that the increased tension may be due (1) to a simple swelling of the lens; (2) to irritation by the morgagnian fluid; (3) to a combination of both these causes. Superficial punctate keratitis continued in epidemic form during the year, and the Superintendent is able to give an exceptionally accurate description of the symptoms since he contracted the disease himself. Fortunately the attack was a mild one. Many cases of interest are recorded, and the report provides information and statistics regarding the incidence of eye disease in the Tropics which are of great value to all ophthalmic surgeons and investigators. *H. Kirkpatrick.*

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[14] MADRAS. Administration Report, Statistics and Professional Report of the Government Ophthalmic Hospital Madras, for the Year 1931 [WRIGHT (R. E.), Supt.].—54 pp. 1932. Madras.

TROPICAL DERMATOLOGY.

TEDESCHI (Carlo). Casi di dermatite polimorfa epidemica da miceti in territorio di Derna. [**Outbreak of Dermatitis of Fungal Origin in Derna (Cyrenaica).**]—*Arch. Ital. Sci. Med. Colon.* 1932. Feb. 1. Vol. 13. No. 2. pp. 72–93. With 18 text figs. English summary (7 lines).

During the period August 1930 to the spring of 1931 the author observed several patients affected with what was believed to be scabies. They had more or less associated with camels and there is a variety of sarcoptes common on camels. He, however, failed to find them on these patients, but from lesions in man and also in camels, horses, and Abyssinian mules he was able to isolate and cultivate a species of mould belonging to the Mucoraceae. In animals he saw the condition only in those which were in a poor state from bad diet with deficient vitamins. In man the lesions were of a pruriginous character, with branny desquamation, or with miliary eruption, in severe cases papulo-pustular. They were common on the legs, abdomen, neck and shoulders. Experimentally, the author could not reproduce the disease by applying a culture to the skin of healthy animals—horse, ass, goat, sheep, dog or cat—probably, he thinks, because they were well nourished. He succeeded, however, in producing a papulo-pustular lesion in one case, a scabby crusted lesion in a second in horses after treating the skin with (?) emery paper (carta vetrata) and obtained a growth again from these lesions. [This is not altogether conclusive; might it not be mere growth of an implanted mould on a wound?]

H. H. S.

CATANEI (A.). Recherches sur les teignes dans quelques agglomérations de la côte orientale de l'Algérie. [**Incidence of Ringworm in Population of Eastern Coast of Algeria.**]—*Bull. Soc. Path. Exot.* 1932. Feb. 10. Vol. 25. No. 2. pp. 101–106.

Work carried out in May 1931 in the six chief ports and fishing villages. Among 2,554 children, 113 showed trichophytic infections of the scalp and 58 suffered from favus. The great majority occurred in natives, 14 only being seen in children of European or Jewish stock. The actual percentage incidence was also much greater among the natives. Favus was found to be rare under the age of six years and was less common among girls. Cultures grew *Tr. glabrum* in 66 cases and *Tr. violaceum* in 42 cases. A few isolated examples of *Tr. fumatum*, *Tr. regulare* and *Tr. cerebriforme* were also found. All the cases of favus proved to be due to *A. schönleini*. *M. Sydney Thomson.*

CATANEI (A.). Résultats de l'étude des teignes dans quelques agglomérations de la côte occidentale de l'Algérie et d'une nouvelle enquête en Oranie. [**Results of the Study of Ringworm among the Villages on the Western Coast of Algeria and of a New Investigation in Oran.**]—*Bull. Soc. Path. Exot.* 1932. July 6. Vol. 25. No. 7. pp. 694–699.

Investigations carried out along lines similar to those previously used in other parts of Algeria. Among 1,499 children of European stock there were 40 cases of Trichophyton infection of the scalp, 4 of

favus and 1 of Microsporon Audouini. Among 705 Mohammedan children 48 examples of scalp trichophytosis and 65 of favus were seen. The corresponding figures in 710 Jews were 19 and 9. Only among the Mohammedans was the percentage of infection higher among boys than girls. Cultures proved *Tr. violaceum* and *Tr. glabrum* to be the most common fungi, but *Tr. acuminatum, Tr. fumatum* and *Tr. crateriforme* were also found. All cases of favus were due to *A. schonleini.*

M. S. T.

URUENA (Jesus Gonzalez) & OCHOTERENA (Isaac). Épidémies familiales de tondantes à *Trichophyton pilosum.* [**Familial Epidemics of Ringworm due to** *Tr. pilosum.*]—Reprinted from *Ann. Dermat. et Syph.* 1932. Mar. 7th Ser. Vol. 3. No. 3. pp. 244–254. With 12 text figs.

Among 137 cases seen in Mexico, 34 occurred in 15 different families. The scalp lesions were usually typical of the disease, but occasionally follicular hyperkeratoses and the rare " black dot " form were seen. In spite of these clinical differences the *Tr. pilosum* was apparently responsible in every case. *M. S. T.*

MANSON-BAHR (P.). *Trichosporon beigeli* **Parasitic on Human Hair from Nigeria.** [Laboratory Meeting.]—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1932. June 30. Vol. 26. No. 1. p. 9.

Describes a specimen from the pubic hair, in which region there was an isolated patch of infection. The spores were demonstrated by Weigert's method and successful cultures were obtained after soaking the hairs in absolute alcohol for 30 minutes and then washing them in saline before inoculating Sabouraud's medium. The fungus produces small irregular nodes on the hair, the resulting disease being known as Trichomycosis nodosa of Behrend. *M. S. T.*

PUNTONI (V.) & PAMPANA (E. J.). **A Copper-Coloured Variety of Caraate caused by** *Trichophyton megnini* (*Tr. rosaceum*).—*Jl. Trop. Med. & Hyg.* 1932. May 16. Vol. 35. No. 10. pp. 154–156. [15 refs.]

A detailed review of the literature concerning " Caraate " is followed by a description of one case seen in Colombia. A negro, in whom the disease had persisted for eleven years, showed several small areas of a brownish coppery hue on both arms. On the abdomen there was a larger blackish sheet, whilst the back bore some lighter and shining patches. Specimens were sent to Rome for cultural investigation and presented an overwhelming growth of *Tr. megnini.* A few colonies of other organisms also developed but these were considered to be of very little importance in this case. *M. S. T.*

KESTEN (B. M.), ASHFORD (B. K.), BENHAM (R. W.), EMMONS (C. W.) & MOSS (M. C.). **Fungus Infections of the Skin and its Appendages occurring in Porto Rico. A Clinical and Mycologic Study.**—*Arch. Dermat. & Syph.* 1932. June. Vol. 25. No. 6. pp. 1046–1057. With 5 text figs.

Eighty patients suffering from mycotic infections were studied. The clinical features were all typical and comprised scalp and nail lesions as

well as those of the glabrous skin and feet. Cultures were successful in only 46 per cent., the fungi being essentially the same as those found in more temperate climes. A case of apparent Acladiosis is described, but from it *Penicillium spiculisporum* was isolated. *M. S. T.*

MONTPELLIER (J.), CATANEI (A.) & LEFRANC (R.). Un nouveau cas de sporotrichose humaine observé en Algérie. [**Another Case of Sporotrichosis in Algeria.**]—*Bull. Soc. Path. Exot.* 1932. Apr. 13. Vol. 25. No. 4. pp. 297–298.

A native woman aged thirty years. A year before she came under observation she had noticed a button-like lesion on the left foot. This spread until the inside of the foot, the ankle and the lower third of the leg were covered with nodules varying in size from that of a pea to that of a small nut. Each lesion had a sinus from which exuded a a sero-purulent discharge. Some ulceration and slight scarring were also present but there was no involvement of bone or glands. The organism proved to be *Rhinocladium beurmanni*. The disease is apparently healing under the influence of potassium iodide.

M. S. T.

ETCHEVARNE (C.) & NEGRONI (P.). De la localisation multiple du *Monilia albicans*. [**Widespread Localization of** *Monilia albicans*.]—*Rev. Sud.-Américaine de Méd. et de Chirurg.* Paris. 1932. June. Vol. 3. No. 6. pp. 477–482. With 2 figs.

An account of the lesions observed in an Argentine infant aged 3½ months. When first seen, irritable papules had been present on the exposed surfaces for about four weeks. There were also white patches on the tongue and on the mucous membranes of the cheeks, these being accompanied by fissuring at the corners of the mouth. Gradually the eruption invaded the whole of the trunk and became pustular; in the flexures it appeared as an excoriated intertrigo. Direct smears and cultures prepared from material from all the lesions, revealed the presence of the same organism, *M. albicans*. Borax and copper sulphate baths quickly resulted in cure. *M. S. T.*

FRÓES (Heitor P.). Sur un champignon brésilien producteur de mycétome à grains rouges (*Nocardia genesii*, H. Fróes, 1930). [**A Brazilian Fungus causing Mycetoma with Red Granules.**]—*Rev. Sud.-Américaine de Méd. et de Chirurg.* Paris. 1932. June. Vol. 3. No. 6. pp. 495–501. With 6 figs.

An account of further work carried out with material obtained from a case seen in 1915. The cultural and histological features which distinguish this organism from *N. pelletieri* and *N. africana*, are dealt with in detail. *M. S. T.*

FIALHO (Amadeu). Dermatite verrucosa. [**Dermatitis verrucosa.**]—*Brasil-Medico.* 1932. Aug. 20. Vol. 46. No. 34. pp. 731–732. With 2 figs.

The patient, a man of 45 years, presented himself with an ulcerating sore on the dorsum of his left hand, which had persisted for two years

or more in spite of varied treatment. Cultures resulted in the growth of granular blackish masses described as one of the Chromoblastomycoses, a name given to the group by FONSECA. Sections from the lesion showed marked keratosis, scattered isolated giant cells and minute collections of pus ; epithelioid cells were seen in some, but not in all, sections. Healing followed the local application of chloride of zinc. *H. H. S.*

DELANOË (E.). Eruption verruqueuse aux mains et aux pieds chez une fille musulmane. [**A Warty Eruption on the Hands and Feet of a Native Girl.**]—*Bull. Soc. Path. Exot.* 1932. Apr. 13. Vol. 25. No. 4. pp. 325–326.

Very numerous sessile warts were seen on the dorsa of the hands and feet, with a few on the palms. The pathology was apparently simple. Three cc. of a ten per cent. solution of quinine and urethane were injected intramuscularly into the buttocks. This caused erythema and pain in the affected areas. Five subsequent injections were followed by similar changes, but during the course of treatment the warts gradually blackened and dried ; eventually they vanished completely. *M. S. T.*

PARDO-CASTELLO (V.). **Achromia Parasitaria : its True Nature and Etiology.**—*Arch. Dermat. & Syph.* 1932. May. Vol. 25. No. 5. pp. 785–789.

After a detailed examination of the literature the author epitomizes his present views. The disease really represents a group of epidermomycoses due to different fungi, *e.g.*, Tinea flava, T. alba, etc. The resulting achromia is probably caused by the action of the fungi on the pigmentary mechanism of the skin and is independent of sun effects. The dyschromia may be compared with the increased pigmentation which may persist for a long time after such inflammatory conditions as impetigo and eczema. *M. S. T.*

AFRICA (Candido M.). **Studies on Experimental Creeping Eruption in the Philippines.**—*Philippine Jl. Sci.* 1932. May. Vol. 48. No. 1. pp. 89–101. With 5 plates & 1 text fig. [15 refs.]

This interesting paper deals with *Ancylostoma braziliense*, a hookworm very commonly parasitic in cats, and to a certain extent infesting also dogs and human beings, in the Philippines. In the Southern United States and Central America this species (first discovered in Brazil) is known more as a skin-parasite and one of the causes of creeping eruption in man. In the Philippines (and other parts of the Oriental region) it so far is known chiefly as an intestinal parasite—indeed among the Philippine natives no "natural" case of its causing creeping eruption in man seems to have been observed, and this fact seems to have been explained as due to a natural resistance or immunity of the human skin to such infestation. The author, however, has produced creeping eruption experimentally in two young male adult Filipinos quite clear of any evidence of intestinal infestation by applying third-stage larvae of *A. brasiliense* to their skin. *A. Alcock.*

ASHFORD (Bailey K.). Las enfermedades micoticas en Puerto Rico.—*Bol. Asoc. Med. de Puerto Rico.* 1932. Apr. Vol. 24. No. 199. pp. 146–152. [15 refs.]

BROSIUS (Otto T.). Foot-Itch.—*Twentieth Ann. Rep. Med. Dept. United Fruit Company, Boston, Mass.* 1931. pp. 185–188.

ESCOMEL (Edmundo). Sobre pinta o ccara en el Perú.—*Crónica Méd.* Lima. 1931. Nov. Vol. 48. No. 821. pp. 367–371.

KALA AZAR.

SHORTT (H. E.) et al. **Reports of the Kala-Azar Commission, India. Report No. II (1926–1930).**—*Indian Med. Res. Memoirs. Supplementary Series to Indian Jl. Med. Res.* 1932. Aug. Memoir No. 25. pp. iv.+200. With 1 fig., 1 chart & 10 figs. on 1 plate. [6 pages of refs.]

The Kala Azar Commission, which was formed in 1924 under the directorship of S. R. CHRISTOPHERS to carry out research work on this disease in Assam, came to an end in 1931 owing to the decline of the epidemic and the change in the character of the cases which continued to occur in small numbers, a change which rendered them unsuitable for experimental work. The report now under review is the second one of the Commission and has been compiled by H. E. SHORTT, who has been Director of the Commission since 1925. The first report (this *Bulletin*, Vol. 23, p. 567) recorded the work carried out up to October 1925, while the second covers the period between this date and the closing down of the commission in 1931.

The report under review is a collection of papers, many of them considerably curtailed for reasons of economy, which have already been published, together with nine which are published for the first time. In the introduction the position regarding transmission is reviewed. It is admitted that transmission by the bite of the sandfly, successfully accomplished in one instance, is the most attractive hypothesis but it has to be remembered that an equally strong claim, backed by more than one successful experiment, can be made for oral transmission. A third theory which may be regarded as combining the first two is that of infection by the oral route through the ingestion of infected sandflies or the products of crushing them. This theory is supported by one successful experiment. The view that the hookworm may play a part appears to be completely ruled out. It is pointed out that even if the natural method of introduction of parasites into the body is determined it would not follow that such an introduction would be invariably followed by kala azar. It would appear that some accessory factor rendering the individual more susceptible at the time of inoculation is necessary. It is noted that MCCOMBIE YOUNG drew attention to the fact that the epidemics of 1890–1900 and 1917–1929 were preceded by a devastating earthquake in the one case and by a more devastating influenza pandemic in the other. It seems possible that the final solution of the problem may have to await the onset of a fresh epidemic.

The nine papers which have not previously been published will be considered under their respective titles.

1. Changes in the Leucocyte Picture in Kala-Azar after Adrenalin Injection and their Significance [KRISHNAN (K. V.)]. pp. 23–31.

HUGHES and SHRIVASTAVA (1930) had shown that the injection of 1 cc. of 1 in 1,000 adrenalin solution into subjects of malaria was followed by an increase in the monocytes of the peripheral blood in 8 cases and a decrease in 2 cases. The 2 cases were severe and it was proved that after treatment and cure they reacted to adrenalin as the other cases had done. The suggestion was that the cells of the reticulo-endothelial system probably play an important part in overcoming malarial infection. The author of the present paper decided to test the reaction in cases of kala azar. The results show that in the majority of untreated cases there is a definite fall in the monocytes following injection

of adrenalin while after completion of treatment there is an increase, results which indicate that monocytes probably play an important part in recovery from kala azar. A reticulo-endothelial system exhausted by attacks of malaria may make an individual susceptible to kala azar, recovery from which, as in malaria, is dependent on the satisfactory response of this system.

2. Transmission Experiments in Kala-Azar with Hookworms [SHORTT (H. E.), CAMPBELL (H. G. M.) & LAL (C.)]. pp. 73–79.

The authors describe experiments designed to test the possibility of infection by hookworm larvae. Cultures were commenced with the eggs of both human and canine hookworms, and 24 hours later, when a large proportion of the eggs were hatched, an emulsion of the liver and spleen of a heavily infected animal was mixed in, the intention being to give the larvae the opportunity of ingesting *Leishmania donovani* in the form which might escape in faeces. The cultures were kept at 25°C. for six days by which time the larvae were in the infectious stage. They were utilized as follows. A number were crushed in a mortar and examined microscopically for evidence of leishmania infection. Others were fed to hamsters or placed on the shaved abdomen of these animals; still others were inoculated intraperitoneally. Of 27 hamsters treated in one or other of these ways none became infected. There was no evidence of infection of the larvae with leishmania.

3. Transmission Experiments in Kala-Azar by Contaminative Methods [SHORTT (H. E.), SMITH (R. O. A.) & SWAMINATH (C. S.)]. pp. 79–89. [13 refs.]

In this paper are recorded a number of experiments to test the possibility of infection by the contaminative method where the urine or faeces of infected human beings or animals were used as the source of infection. It had already been shown by SHORTT (1923) and SHORTT, SWAMINATH and SEN (1923) in the case of human beings that *L. donovani* might escape from the body in urine, an observation extended to hamsters by YOUNG and HERTIG (1927). This occurrence of leishmania in urine appears to be associated with the presence of blood which can be demonstrated in a considerable percentage of cases of kala azar. The authors state that recently they have demonstrated leishmania in the urine of two further cases of kala azar. Of a series of 10 hamsters to which the urine of cases of kala azar was administered by the mouth on an average 179·4 times and a series of 15 to which urine from infected hamsters was given on an average 164 times not one became infected. It having been shown by SHORTT, SMITH, D'SILVA and SWAMINATH (1929) that *L. donovani* sometimes escaped in the faeces of cases of kala azar similar experiments were conducted with faeces. With the faeces of kala azar cases 14 hamsters received on an average 37 feeds each, while with the faeces of infected hamsters 18 received on an average 151 feeds each. In only one case did infection result in a hamster fed 160 times during 467 days with hamster faeces.

Further experiments to demonstrate infection by the oral route are recorded. In these seven Chinese hamsters were given a dose of infected liver and spleen emulsion in normal citrated saline solution. These animals examined on an average 117 days after the feed all showed a heavy infection. In another similar experiment with Chinese hamsters the animals were killed and examined at short

intervals after feeding. It was determined that apparently unaltered parasites could be discovered in the intestine up to 48 hours after administration by the oral route and that they were demonstrable in the liver and spleen as early as a week after a single dose of infective material by the mouth.

A further series of experiments were carried out by housing in contiguous cages healthy and infected hamsters. An experiment of the kind had already been reported by SHORTT, CRAIGHEAD, SMITH and SWAMINATH (1930). In this in each of a series of boxes were placed two cages in contact with one another. In one cage of each pair was a healthy hamster and in the other an infected one. There was free contamination of each other's food by the respective units of each pair. Of six originally healthy hamsters two became infected. This result was so striking that it was repeated on a larger scale in the experiments here described. The type of association of the healthy and infected animals was varied slightly but of 37 healthy animals only one showed an infection. It had been in association with an infected animal for 453 days. When its infection was discovered its associate was examined and found to be free from infection. It was impossible to decide whether this was a case of recovery from infection or whether the animals had at some time been changed over, though the rule was that after the commencement of the experiment the cages were not to be removed from the larger receptacle at any time nor to be opened for cleaning. It is pointed out that cases of hamsters losing their infections are not unknown.

In another experiment three gibbons (*Hylobates hooluck*) were inoculated intraperitoneally with liver and spleen emulsion from infected hamsters and one of these was given in addition a large dose by the mouth. The animals were kept in a large ten foot cage with two normal gibbons. One inoculated gibbon died after 137 days and was found heavily infected. It was probably the animal which received the oral dose of material. Another inoculated animal examined after 357 days was found infected. Of the three remaining one was examined after 383 days and two after 490 days with negative result. One of the inoculated animals thus escaped infection or, what the authors regard as more probable, recovered.

4. Miscellaneous Experiments with *Phlebotomus argentipes* **in Relation to Transmission of Kala-Azar** [SHORTT (H. E.), SMITH (R. O. A.) & SWAMINATH (C. S.)]. pp. 90–102.

In this paper are described a series of experiments with sandflies. In the first place an attempt was made to infect six white mice by the bites of infected *P. argentipes*. The six animals were kept 63 to 289 days and were fed upon by sandflies 44 to 117 times. Of these sandflies some at least were proved to be infected. The result was entirely negative. In another experiment cultures were made on N.N.N. medium from a piece of ground-up skin of a mouse which had been removed from the animal after an infected sandfly had fed on it. The experiment was repeated three times but it was not possible to demonstrate that leishmania had been injected into the pieces of skin by the sandflies.

A series of Chinese hamsters were fed a number of times on emulsions of sandflies infected either by feeding on kala azar cases or by artificial feeding with an emulsion of infected liver and spleen by a modification of Hertig's method. In all 21 hamsters were used but only one, which had been fed 21 times on artificially infected sandflies, was found to be

infected 192 days after the commencement of the experiment. The method of feeding sandflies artificially is described. It consists in the insertion of the proboscis into a fine capillary tube, the fly being held during the process by its wings inserted into a split in a piece of cork.

Another section of this paper is devoted to a consideration of the bionomics of *P. argentipes* in Assam, where the year is divisible into a rainy and a cold season; the former with an average temperature of 84°F. covers the period March to October while the latter has an average temperature of 60°F. In Assam there is thus no true hot weather, the discomfort of the rainy season being due to the excessive humidity. The sandflies are practically absent during the cold season; adults beginning to appear in mid-February are numerous in March and April. The maximum prevalence is in September and October. Other features noted are those connected with feeding habits, oviposition, number of eggs laid, duration of the embryonic, larval and pupal stages, breeding sites, food and others, all of which have an indirect bearing on the question of kala azar transmission.

5. Miscellaneous Experiments in Kala-Azar [SHORTT (H. E.), SMITH (R. O. A.) & SWAMINATH (C. S.)]. pp. 103–108.

In this the next paper are described various experiments and observations not previously published.

The transmissibility of *Leishmania donovani* through the placenta was tested by the examination of fifteen young mice born of infected parents. In no case was infection detected.

The claim by YOUNG and HERTIG (1927) that they had infected Chinese hamsters with the leptomonad of the N. African lizard *Tarentola mauritanica* led the authors to make similar experiments with the leptomonad of the Indian gecko of the genus *Hemidactylus*. On one occasion SHORTT and SWAMINATH (1928) found leishmania forms of this parasite in the peripheral blood of a gecko. Usually the flagellate is only demonstrable by culture of the blood. Cultures of the flagellate were inoculated on a number of occasions to two hamsters but no infection resulted. As from geckos themselves the flagellate is only occasionally cultivated it seemed possible that its presence in the blood might be accidental as a result of invasion from the intestine shortly after ingestion by the gecko of some infected insect. Accordingly geckos were fed on cultures of the flagellate but no infection was subsequently demonstrable.

The authors record the growth of a trypanosome in a tube of N.N.N. medium inoculated with liver puncture material from a human being for diagnosis of kala azar. The trypanosome was easily sub-cultured and grew with great rapidity. The trypanosome was mostly in the crithidial form but in old cultures trypanosme forms of the *T. lewisi* type occurred. Reinvestigation of the human subject did not support the view that the trypanosome originated from him. It was concluded that it was probably the trypanosome of the rabbit whose blood had been employed to make the medium.

An unusual type of dermal leishmanoid is described from a village at the foot of the Khasi Hills. It was noticed that the legs below the knees were greatly thickened and suggested elephantiasis. On closer inspection the arms, trunk and face were seen to be similarly affected. The whole of these areas but especially the legs were covered with reddish nodules small and large. The case appeared at a distance like elephantiasis but near like nodular leprosy. Numerous leishmania

were found in the lesions. The man stated that two years previously he had suffered from kala azar but had recovered without treatment. The condition described had been developing for a year. As SHORTT, D'SILVA and SWAMINATH (1928) had successfully infected *Phlebotomus argentipes* by feeding on a case of dermal leishmanoid it was thought that the case described here would give even better results. However, out of 203 sandflies fed on the lesions not one became infected. On cutting sections of one of the nodules it was found that the parasites were in most cases too far below the epidermis to be reached by the proboscis of the sandfly.

With reference to the relative value of direct microscopical examination or culture of liver or spleen puncture material it is pointed out that of 709 positive cases in which the material was subjected to both tests in only 28 cases did the culture method reveal an infection missed by the microscopical examination. As regards parasites in the peripheral blood, of 942 patients suffering from kala azar 688 revealed parasites after a single examination.

Reference is made to animals susceptible to inoculation. The Hooluck (*Hylobates hooluck*) and the Slow loris (*Nycticebus coucang*) were both readily infected by intraperitoneal inoculation of infected liver or spleen.

Finally it is recorded that of 36 bed bugs fed on a lesion of dermal leishmanoid one showed flagellate forms when dissected subsequently.

6. A Comparative Study of Susceptibility to Infection with *L. donovani* in Splenectomized and Non-Splenectomized Mice [KRISHNAN (K. V.)]. pp. 109–112. [28 refs].

In this paper are described experiments destined to test the influence of the spleen on susceptibility to inoculation with *Leishmania donovani*. Both splenectomized and normal mice were inoculated with infected spleen emulsion or with cultural forms of the parasite preceded or not by injections of Indian ink. There was no difference in the susceptibility of the normal and the abnormal animals.

7. The Viability of *Leishmania donovani* outside the Body of its Mammalian Host [SHORTT (H. E.), SMITH (R. O. A.) & SWAMINATH (C. S.)]. pp. 136–140.

It is noted that the observation that leishmania might occur in the urine and faeces of kala azar cases has been repeated in more recent work. As it did not follow that parasites thus discharged from the body would survive for any length of time experiments were designed to test the survival time under various conditions. It was found that in the forms from the liver and spleen survival in full strength milk would occur for four days as demonstrated by culture in N.N.N. medium. In milk diluted with citrate of sodium solution actual culture of the parasite was obtained. On the surface of sterile soil moistened with sterile urine or water survival for 24 hours occurred. Dried on pieces of glass the parasites, except in one doubtful experiment after four hours, were invariably killed.

8. The Incidence of Achlorhydria amongst the Population of a Kala-Azar Endemic Area and its Significance [KRISHNAN (K. V.)]. pp. 191–194. With 1 chart.

If the mode of infection with kala azar is by the mouth then the acid content of the stomach is likely to be of some importance. Accordingly

the gastric acidity of the population of an endemic area of kala azar was investigated. The results revealed the fact that about 27 per cent. showed achlorhydria. In malarial cases the incidence is much higher (about 30 to 60 per cent.). A large percentage of kala azar cases also show this condition (about 30 to 45 per cent.). It would seem therefore that the lowered acidity of the stomach contents in malarial subjects should render them more suitable than normal persons for oral infection with kala azar.

9. Notes on Some *Culicoides* **from Assam** [SMITH (R. O. A.) & SWAMINATH (C. S.)]. pp. 182–186. With 10 figs. on 1 plate.

The last of the papers not previously published deals with Culicoides in Assam and is of purely entomological interest. *C. M. Wenyon.*

SCOTT (Annie V.). **Kala-Azar in Children of North China.**—*Arch. Dis. in Childhood.* 1932. Apr. Vol. 7. No. 38. pp. 59–64. With 1 chart in text.

——. **The Treatment of Kala Azar in Children.**—*Ibid.* 1932. Aug. Vol. 7. No. 40. pp. 213–224.

The first paper gives an account of the clinical features of one hundred cases of kala azar as observed in children aged one and a half to twelve years in North China. The disease appears to correspond in all respects with infantile kala azar of other endemic centres. In the second paper the author describes the treatment of 134 cases with various preparations of antimony. The drugs used were sodium antimony tartrate, antimosan 681, stibamine glucoside, stibosan 471 and neostibosan. Of these the author writes the least favourably of the first, which requires a long course and is directly related to the occurrence of bronchopneumonia, and the most favourably of neostibosan, the full course of which can be given in a shorter time than that required for any of the other drugs, all of which, however, may bring about a cure. As regards the criterion of cure the only one at present available is the continued freedom from symptoms. *C. M. W.*

FRANCO (E. E.) & MANAI (A.). Nuove ricerche sulle leishmaniosi in Sardegna. [**Leishmaniasis in Sardinia.**]—*Ann. di. Med. Nav. e Colon.* 1932. Mar.–Apr. 38th Year. Vol. 1. No. 3–4. pp. 137–153. With 2 plates (1 map). English summary.

The paper gives a brief account of 24 cases of kala azar and 7 cases of oriental sore which have occurred in Sardinia. All the cases were diagnosed by discovery of leishmania, five of them having been seen by the authors themselves, the others having been heard of by them indirectly. On a map is shown the distribution of the cases in the island. *C. M. W.*

CASSOUTE, GIRAUD (Paul) & TRABUC (Fernand). Un nouveau cas autochtone de kala azar chez l'adulte. Guérison par le traitement stibié. [**A Fresh French Case of K.A. in the Adult.**]—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1932. July 4. 48th Year. 3rd Ser. No. 23. pp. 1070-1072.

Though cases of infantile kala azar are fairly common in France, over a hundred having been recorded, cases in adults are rare. On this account

the authors are led to describe a case in a young woman twenty years of age. This is the fourth adult case to be recorded from Marseilles and the eleventh for France in general. A cure was effected by treatment with tartar emetic followed by neostibosan. *C. M. W.*

GUHA (Prankumar). **Reticulo-Endothelial System in Kala-Azar.**—*Calcutta Med. Jl.* 1932. June. Vol. 26. No. 12. pp. 469–482. [13 refs.]

As in eight out of twelve cases of kala azar a delayed direct van den Bergh's reaction and a positive reaction for urobilin in the urine was obtained, the author considers that these results may be of assistance in the diagnosis of the disease. In all cases of kala azar tested the liver function test with levulose was normal. *C. M. W.*

UZAN (Lucien) & SANTILLANA (A.). Sur la valeur diagnostique et pronostique du syndrome humoral dans le kala-azar. [**Diagnostic and Prognostic Value of Chemical Reactions in K.A.**]—*Tunisie Méd.* 1932. July–Aug. Vol. 26. No. 7. pp. 341–345.

Investigating in a case of infantile kala azar the formol-gel, the antimony and the distilled water reactions, the authors were struck by the fact that they were still positive at the end of a course of treatment with tartar emetic when it appeared that a clinical cure had been obtained and there had been an absence of fever for fifty-seven days. The treatment consisted of the injection, every second day, of one centigram of the drug till forty injections had been given. The persistence of the positive reactions led the authors to consider a further course of treatment, but a week later the reactions were less marked so that they think it possible that the humoral equilibrium is not re-established till some time after a clinical cure has been obtained. *C. M. W.*

CHOPRA (R. N.) & CHAUDHURY (S. G.). **The Prognostic Value of the Aldehyde Reaction in Kala-Azar.**—*Indian Med. Gaz.* 1932. May. Vol. 67. No. 5. pp. 260–262.

If in a case of kala azar the time of gelation of the serum after the addition of formalin as carried out in the aldehyde test is known, any increase in this time after treatment has been commenced may be regarded as a favourable sign. If in any case the time of gelation is over half an hour, satisfactory progress towards cure may be assumed to be taking place. *C. M. W.*

KRISHNAN (K. V.), LAL (Jemadar Chiranji) & NAPIER (L. Everard). **Cytological Studies of the Blood and Tissues in Kala-Azar and Associated Conditions. Part II. Morphology of the Leucocytes in Supra-vital Preparations.**—*Indian Med. Gaz.* 1932. Mar. Vol. 67. No. 3. pp. 130–135. With 26 coloured figs. on 1 plate. [17 refs.] **Part III. Large Mononuclear Cells in Human Malaria** [NAPIER et al.].—*Ibid.* pp. 135–139. With 2 charts in text. [10 refs.] **Part I. Supra-vital Staining Technique** [NAPIER et al.]. —*Ibid.* 1932. May. No. 5. pp. 251–254. [10 refs.]

In studying the cells of the blood and tissues in kala azar and allied conditions by methods of vital staining, it was necessary first to adopt a definite nomenclature. To this end the leucocytes of the blood of a number of healthy human beings and animals were studied. The first

paper (Part II) describes the characters of the polymorphonuclear leucocyte, the eosinophilic leucocyte, the lymphocyte and the large mononuclear cell; the last embracing both the monocyte and the histiocyte. These various cells are illustrated in a coloured plate which shows clearly the size and shape of these cells, the type of nucleus of each and the various granules as displayed by supra-vital staining with a mixture of neutral red and Janus green. The variations in the relative proportions of these cells in man and in the monkey, rabbit, mouse and hamster are shown in a Table. In the second paper (Part III) are discussed the findings as regards the large mononuclears in 60 specimens of blood from 12 cases of human malaria before and after treatment. In acute malaria before treatment the large mononuclear count ranged between 4 and 10 with an average of 7 per cent. The monocytes were less than 2 per cent., and the intermediate forms and histiocytes 2·5 per cent. each. After the administration of specific drugs there was a marked rise to 6 to 17, with an average of 11 per cent., the monocytes and histiocytes both contributing equally to this increase. In chronic malaria before treatment the count is low, 2 to 7 with an average of 4·5 per cent. The cells are mostly monocytes with few intermediate forms and fewer histiocytes. After treatment there is an increase to about 6 per cent., which is less than in acute cases. To this figure all three types of cell contribute equally. It thus appears that one of the beneficial functions of antimalaria drugs is the stimulation of the natural process of cellular immunity, namely the mobilization of the large mononuclear phagocytic cells of the reticulo-endothelial system. In the process of cure both monocytes and histiocytes play equally important parts. It is hoped that this study of the behaviour of cells in malarial infections will afford an explanation of the fact that malarial subjects are more liable to be attacked by kala azar than normal individuals and throw some light on the whole question of susceptibility to this disease.

The last paper (Part I) of this series, describes in detail the technique of supra-vital staining with neutral red and Janus green. It is of the utmost importance that perfectly clean and smooth slides and cover glasses should be used and the method of preparing these is described. On the clean slide is left by a draining process a very thin film of alcoholic stain which is carefully dried. On this the cover glass with its drop of blood or other body fluid is inverted, the preparation thus formed being examined on the warm stage if necessary. In the main the method is that of SABIN and her co-workers. It is pointed out that the coloured granules which appear in mononuclear cells are not the result of staining of preformed granules in the cell but are collections of granules of stain which have been phagocyted by the cell and distributed in its cytoplasm in a selective manner so that particular types of cell can be recognized by this distribution. It is noted that for satisfactory and uniform results the method requires a good deal of experience. Those who wish to employ it should consult the original article for details. *C. M. W.*

SHORTT (H. E.) & SWAMINATH (C. S.). **The Relative Susceptibility of Chinese Hamsters** (*Cricetulus griseus*) **to Kala-Azar by the Oral and Subcutaneous Routes.**—*Indian Jl. Med. Res.* 1932. July. Vol. 20. No. 1. pp. 135–138.

In a series of tests with Chinese hamsters it was found that employing the non-flagellate forms of *Leishmania donovani* infections were as

readily produced by the subcutaneous as by the oral route of administration. With the flagellate stage from the culture tube the subcutaneous route was more effective than the oral. The infection rates were practically 100 per cent., except in the case of administration of flagellate forms by the mouth, when it was under 50 per cent.

C. M. W.

GIRAUD (Paul). Sur l'origine canine du kala-azar méditerranéen. [**The Canine Origin of Mediterranean K.A.**]—*Bull. Soc. Path. Exot.* 1932. June 8. Vol. 25. No. 6. pp. 558–561.

Examining the conditions of life, especially the possibility of association with dogs, of 59 cases of infantile kala azar in Marseilles, the author concludes that though it is not impossible that human beings contract the disease from dogs the available data are insufficient to prove this. It appears to him more probable that the human and canine diseases are independent of one another though spreading simultaneously amongst children and dogs respectively.

C. M. W.

ADLER (S.) & THEODOR (O.). **Investigations on Mediterranean Kala Azar. VI.—Canine Visceral Leishmaniasis.**—*Proc. Roy. Soc.* Ser. B. 1932. May 2. Vol. 110. No. B 768. pp. 402–412. With 7 figs. on 2 plates. [20 refs.]

The authors call attention to the fact, already noted by them, that in canine kala azar in Malta the parasites occur throughout the skin of the body in macrophages which are found not only in infiltrations round hair follicles but also in apparently normal dermis. This distribution of parasites in the skin differs from that in canine oriental sore, where infiltration of macrophages is dense and not confined to hair follicles, while the presence of these cells in the dermis is accompanied by infiltration with plasma and small round cells. The accumulation of infected macrophages round the hair follicles in kala azar leads to the condition of seborrhea and depilation, the chief cutaneous manifestations of the disease. The presence of parasites in the skin of dogs appears to have a direct influence on the infection rate in sand-flies fed on them. Thus of *Phlebotomus perniciosus* fed on three infected dogs infection rates of 64·5, 32 and 62·5 per cent. were obtained. Of 113 of these sand-flies fed on two cases of infantile kala azar in Malta none became infected. Previously in Catania an infection rate of 6·25 per cent. was obtained when only selected cases were used. It thus appears that though in human cases the spleen infections are very much heavier than in dogs, the infection rate in *P. perniciosus* fed on human cases is negligible as compared with that obtained by feeding on dogs. Of 100 dogs examined in Malta 11 were found infected. A number of dog fleas collected from infected dogs, and a few *Stegomyia fasciata* and nymphs of *Rhipicephalus sanguineus* fed on an infected dog and kept for a number of days were dissected without showing any microscopic evidence of leishmania. *C. M. W.*

DELAMARE (G.), GATTI (C.) & GONZALEZ (D.). Le pied végétant du Paraguay (leishmaniose américaine ulcéro-végétante). [**"Mossy Foot" due to Leishmania in Paraguay.**]—*Bull. Soc. Path. Exot.* 1932. May 11. Vol. 25. No. 5. pp. 488–494. With 12 figs. on 2 plates.

Cutaneous leishmaniasis in S. America may produce on the foot, particularly its dorsum, a lesion consisting of papillomatous outgrowths or vegetations of a cauliflower character. Usually a single patch, which may cover the entire dorsum of the foot, occurs but sometimes other patches are found on the heel or side of the foot or on the toes. The vegetations may be soft or hard according to the degree of keratosis which has taken place. When a condition of hyperkeratosis is found the induration is so marked as to be impenetrable to X-rays. The disease is a very chronic one and in eight out of ten cases mentioned as having been seen in Paraguay during the past five years was associated with ulceration and erosions of the nose, leading in three of the cases to perforation of the septum. In two of the cases the nasal lesions were associated with vegetations on the palate. Leishmania were discovered six times in smears and twice in sections. Diagnosis is not as a rule difficult for the foot condition is purely local not producing atrophy of the leg, enlargement of the glands or constitutional disturbances such as are caused by diseases with which confusion can occur. Under tartar emetic treatment improvement may occur but relapse is very liable to take place. These chronic lesions of the foot respond less favourably to treatment than the cutaneous ulcerations or the mucosal lesions of the mouth and nose. *C. M. W.*

SCATURRO (Alberto). Nuovi casi di bottone d'oriente in provincia di Agrigento. Contributo all'unicità dei parassiti di Wright e di Leishmann [*sic*]. [**Oriental Sore in Agrigento.**]—*Riv. Sanitaria Siciliana.* 1932. Apr. 1. Vol. 20. No. 7. pp. 483–485. English summary (4 lines).

In recording further cases of oriental sore from the province of Agrigento in Italy the author calls attention to the fact that several of these cases occurred in individuals who had been living in close association with children suffering from kala azar. He sees in this an argument in favour of the identity of the parasites of kala azar and oriental sore. *C. M. W.*

LAQUEUR (B.). Beitrag zur Therapie der Leishmaniosis cutanea. [**Treatment of Dermal Leishmaniasis.**]—*Arch. f. Schiffs- u. Trop.-Hyg.* 1932. Sept. Vol. 36. No. 9. pp. 489–491.

The author, who has had a large experience of oriental sore in Termes in Usbekistan, says that he has treated over 200 cases with a camphor ointment made by mixing together equal parts of camphor, olive oil and beeswax. The treatment is simple and certain and requires no special apparatus. It can be carried out by patients in their own homes and brings about healing of the sore in one to four weeks. Its use in the case of sores of the nose and eyelid is contraindicated as in these situations it leads merely to an extension of the ulcerative process.

C. M. W.

SCHWARZMANN (B. E.). [**On the Cultivation of and Preparation of Vaccines of Leishmania.**]—*Trop. Med. & Vet.* Moscow. 1931. Vol. 9. No. 1. pp. 1–3. [23 refs.] [In Russian.]

Description of the methods used for the cultivation of *Leishmania tropica* in N.N.N. medium for the preparation of a vaccine for active immunization, as recommended by CHODUKIN. The vaccine consists of a saline suspension of washed flagellates killed by heat. *C. A. Hoare.*

RIZZO (A.). Sul bottone d'Oriente unico delle palpebre. (La prima osservazione in provincia di Messina.) [**Oriental Sore of the Eyelid in Messina.**]—*Riv. Sanitaria Siciliana.* 1932. Feb. 15. Vol. 20. No. 4. pp. 260, 263–266. With 1 text fig. [18 refs.] English summary (3 lines).

The paper describes a case of oriental sore in a boy, there being a single lesion on the upper eyelid. This is the first case to be noted from the province of Messina. *C. M. W.*

D'OELSNITZ (M.). Le diagnostic et le traitement du kala-azar de l'enfant et de l'adulte. [**Diagnosis and Treatment of K.A. in Child and Adult.**]—*Arch. Méd. Gén. et Colon.* formerly *Rev. Méd. de France et des Colonies.* 1932. Jan. Vol. 1. No. 1. pp. 3–24.

A general account of kala azar contributing no new information. *C. M. W.*

MISCELLANEOUS.

LAMBERT (S. M.). **Health Survey of Rennell and Bellona Islands.**—14 pp. With 1 map. 1932. Suva, Fiji.

The early explorers of Polynesia—Cook, Wallis, Bougainville and their contemporaries in the second half of the eighteenth century—discovered a race of men who had no metal or clay or flint but who had built up a complex and beautiful civilization without these materials. The Polynesians, as they were in those days, were craftsmen: they were expert at wood carving, at making nets and mats from fibres and garments from bark cloth (tapa). They made fire by friction, and cooked their food among hot stones in a pit. They constructed great and beautiful houses which were held together by being tied with fibre, and they also made enormous canoes in which they were able to undertake ocean voyages. The people themselves were friendly, courteous, inquisitive and extremely acquisitive, for they had all things in common and knew nothing of the rights of private property. They lived and worked in groups, large parties fishing, gardening or singing together. They saluted one another and strangers by rubbing noses; their hospitality was unbounded and they always provided women for the passing stranger. Their social life was governed by a system of tabu, that is to say of permissions and prohibitions which had divine sanction: disobedience to the tabu, or what we should call crime, was to them unthinkable and unknown. They were ruled by great chiefs, and the person of some of the chiefs was sacred and not to be approached because of the god who dwelt in the man.

Nearly all this life vanished within half a century of the discovery of the islands; all the larger archipelagoes were rapidly civilized by Europeans who cared nothing for what they were destroying. Fragments of the old life remain in a few remote places, which have been spared from the ruthless hand of civilization because they are small and because the people are idle and the products of the country of no value to Europeans. It is for this reason that a little of primitive Polynesia still exists, particularly along the fringe of the Solomon Islands in such islands as Tikopia, Sikiana and the Reef Islands. Some of the poorer and more remote atolls, particularly in the Paumotus, still harbour relatively unaltered Polynesians. But the most interesting relics are the islands of Rennell and Bellona, which have only been influenced by Europe to a very slight extent. Indeed there is no record that any foreigners landed on Rennell before 1856, though we suppose that a few whalers or traders may have done so. Since that date there have been only about eight recorded landings, and Bellona has been even less visited.

In 1930 both islands were visited by Dr. S. Lambert of the International Health Division of the Rockefeller Foundation, who appears to have spent nearly three weeks on them. His name is well known as an authority on Polynesia and Melanesia, in which he has travelled much more extensively than any other medical man. His knowledge of other archipelagoes has enabled him to write a very interesting account of his short visit and to learn as much as was possible in the circumstances. The difficulties were very great. The language is not known to any European, though a vocabulary was collected some years ago, and pidgin English, always inadequate, was only understood by two or three of the people of Rennell. Apart from this difficulty, he

found it almost impossible to enter into the mind of a people whose background and upbringing are so utterly unfamiliar.

Much of the report deals with the material culture and social life of Rennell and, to a less extent, Bellona ; these pages should be read by those to whom they are particularly interesting. To us the parts which are of more immediate value are those which relate to health, and the reader is to understand that those studies are perhaps the only ones that have been made by a medical man among an unaltered Polynesian people. When one remembers the very great difficulties which confronted the worker, and the impossibility of doing much that was desirable, one must congratulate Dr. Lambert on his collection of facts. He gives a clear history of the introduction of foreign diseases ; every time a ship has called there has been an epidemic. The commonest introduced diseases seem to have been colds and coughs, though he speaks also of tuberculosis. It appears that dysentery has also been introduced by Europeans, and that it has died out ; gonorrhoea has also been introduced, and there is no evidence that it persists. No reference is made to measles or smallpox, which have decimated some islands of the Pacific. It appears that very few diseases are truly indigenous. The people suffer from yaws, though a previous investigator failed to find evidence of this disease because the sufferers are quarantined in the bush. It is a matter of great interest to know that yaws exists in these islands, because it has once or twice been suggested that it is not truly native in Polynesia : but the balance of evidence appears to show that it has existed for centuries in practically all parts of Melanesia and Polynesia. Some species of hookworm was also found to be present in nine out of sixteen individuals ; owing to the people's fear of magic, it was a matter of extreme difficulty to obtain any specimens of faeces and the species of worm was not identified. The elevated coral of which Rennell consists is so porous that there is no surface water, and Lambert failed to find any Anopheles. It is frequently a matter of great difficulty to assure oneself that Anopheles is absent from an island which consists of very porous soil, and it would be well that investigators should make a special search for the larvae at the points where fresh water seeps out on the beach just about high water mark. Malaria is apparently absent—at least none was found by examining spleens. It we accept it that Anopheles and malaria are absent, then the apparent absence of filariasis becomes of great interest. It will be remembered that, in the New Hebrides, there is a strong tendency for the filariasis and the malaria rate to vary together, which suggests that the principal vector of the filaria is *Anopheles punctulatus*. The matter requires fuller investigation in some part of Melanesia. Collections of mosquitoes and flies were made, and among them *Aëdes variegatus* was found both on Bellona and Rennell.

Dr. Lambert found time to make a detailed census of considerable parts of the population : he records a count of 723 individuals of all ages in certain districts. The numbers of males and females in the population as a whole are approximately equal. This is consistent with general experience of Polynesian populations ; it is only in certain Melanesian races that considerable disparity exists, there being 110–120 males per 100 females in the population as a whole. It is most interesting to compare Lambert's figure for the population, which he puts at 1,200–1,500, with the rougher estimates made by other visitors within the last dozen years. Deck's estimate was 500 and Stanley's 700, neither of these investigators having made actual counts of large

samples of the population. It is currently assumed that rough estimates are on the generous side, but in this case it is clear that the error was large and in the other direction. The point is of some interest because so much use has to be made of rough estimates by everyone who discusses the population problems of the Pacific.

As one reads Lambert's description of his visit to Rennell and Bellona, one is reminded (except perhaps in details of phraseology) of the work of the earlier explorers. The life which exists to-day in these islands is the life which Banks described so vividly when he visited Tahiti with Cook on the expedition of 1768–1771. Every reader of this report will feel the dilemma which confronts the administration of the Solomon Islands. Is it their duty to the people and also to our descendants to conserve these relics which have continued to exist to the present day because of a series of fortunate accidents? Or should these people be intensively studied and every fact and detail put on record? If they are to be conserved, then we must refrain from studying the language or habits of the people or their diseases, because any visit of Europeans will tend to cause the existing life to disappear. Everyone who has travelled in Oceania would wish to make a prolonged stay on Rennell: he would also wish that all other students should be totally and permanently excluded. But even this compromise would not satisfy the islanders, for they already know a little of the effect of our civilization on communities such as theirs. They wish to have nothing to do with us: they want no government, no doctor and no missionary. On the whole perhaps they are wise.

The report consists of a multigraphed map and 14 pages printed in Suva, Fiji. We suppose that it is an official report to the High Commissioner of the Western Pacific, though that is not stated. We regret that it has not been published in a more accessible way, and we may be permitted to point out that no copy has been received by this Bureau and that we only owe our knowledge of this work to the fact that a private individual called our attention to it. *P. A. Buxton.*

REVIEWS AND NOTICES.

SPREHN (Curt E. W.) [a.o. Professor für Parasitologie und angewandte Zoologie a.d. Universität Leipzig]. **Lehrbuch der Helminthologie. Eine Naturgeschichte der in deutschen Säugetieren und Vögeln schmarotzenden Würmer, unter besonderer Berücksichtigung der Helminthen des Menschen, der Haustiere und wichtigsten Nutztiere.** [Textbook of Helminthology. A Natural History of the Worms parasitic in German Mammals and Birds, especially those of Man, Domestic Animals and Animals of Economic Importance.]—pp. xvi+998. With 374 figs. 1932. Berlin: Gebrüder Borntraeger, W 35 Schöneberger Ufer 12a.

The days are fortunately past when helminthology was looked upon as merely a department of medicine. Indeed the day now seems to be almost at hand when, even in the most old-fashioned universities, instead of being regarded as an insignificant and scarcely respectable branch of zoology, it will find a more prominent place in zoological courses. The older text-books on parasitology dealt with a very limited number of parasitic worms, and tended to give the student an entirely false conception of the scope of the subject of helminthology. During the last three or four years several text-books, mostly in English, have appeared in which the immense advances recently made in this field are reflected and made available to a larger public. Some of these works have been devoted exclusively to the parasitic worms, but practical considerations have caused them still to confine their attention to those occurring in man and the commoner domestic animals.

The present German work is more extensive and more ambitious than any of its predecessors. As its sub-title indicates, its intention is to deal with the worms parasitic in mammals and birds found in Germany, with special reference to those occurring in man, the domestic animals and other animals of economic importance. This marks a great advance. By the extension of the boundary to include the parasites of wild animals, a large number of species are brought under review which are not dealt with in most text-books, while the fur trade has in recent years added a good many animals, often of non-European origin, to the economic list. It only seems a pity that, having gone so far, Dr. Sprehn could not have gone beyond the two highest groups of vertebrates, but this, of course, would have been an almost superhuman task.

The first part of the work deals generally with the natural history of helminths, and includes, among others, sections on the principles of nomenclature and classification; structure and life-histories; diseases caused by worms (with diagnostic methods, treatment and prophylaxis); and helminthological technique. The technical methods described, while reliable and efficient, are for the most part commendably simple, and highly elaborate procedures, such as are sometimes advocated, have been wisely avoided.

The second and larger portion is devoted to a systematic account of the parasites. In addition to the four main groups of parasitic "worms" generally recognized, the Pentastomida are included. There is an ample supply of diagnoses and keys to the species, genera and higher groups. The species considered economically important are briefly but sufficiently described. Species occurring in wild hosts are mentioned without description, but their synonyms, brief data as to their life-histories, and references to the literature upon them are given. A few species which have not been recorded in Europe seem to have crept in accidentally, and a good many typographical and other errors occur in this part of the book. Some of these are corrected in a list of "Berichtigungen" at the end of the volume,

but more attention might have been given to the spelling of names, particularly authors' names. The repeated spelling of *Wuchereria* as *Wucheria* is rather unfortunate.

The first description of new species in a work such as this is a practice which systematists would do well to avoid. In the present book several species are described as new. It would surely have been better to have published the descriptions of these first in some recognized and easily accessible journal.

There are two good indices, the first in the form of a host-list for all the mammals and birds dealt with, the second a general index to the names (including synonyms) of the parasites. There is also an extensive and useful list of references to literature, of which over 1,250 are given.

The numerous illustrations, a large proportion of them original, are a somewhat unhappy mixture of good and clear drawings with indifferent photomicrographs. Photomicrography, as applied to helminthological subjects, does not yet seem to have proved very satisfactory, and in most cases where it has been employed one feels that a camera-lucida drawing would have been better.

Dr. Sprehn is to be congratulated on a very courageous and on the whole successful attempt to deal with a vast and ever-growing subject. His book will undoubtedly prove of very great value to those who have need of such a work of reference. Above all, the breadth of view with which he has planned his undertaking is highly praiseworthy. He has given the student an enlarged, and it is to be hoped a not too terrifying, conception of the subject of helminthology. *H. A. Baylis.*

HELMINTHOLOGICAL ABSTRACTS. Supplement to the Journal of Helminthology. 1932. July. Vol. 1. No. 2. pp. 33–78. Institute of Agricultural Parasitology, Winches Farm Drive, Hatfield Road, St Albans.

Helminthological Abstracts, the second number of which has recently appeared, is issued by Professor LEIPER from the Institute of Agricultural Parasitology. There are to be five parts annually of abstracts of papers on applied helminthology—human, animal and agricultural. The arrangement is alphabetical by journals. In No. 2, 62 journals are thus reviewed. The gist of the contents is given in a few lines of leaded type and further detail follows if required. Obviously in *Helminthological Abstracts* we have a valuable record of current work on this subject, all the more so in that it covers the whole field. The subscription price is 16*s*. 6*d*. a volume.

A. G. B.

WATT (John Mitchell) [M.B., Ch. B. (Edin.), Professor of Pharmacology in the University of the Witwatersrand, Johannesburg] & BREYERBRANDWIJK (Maria Gerdina) [Phil. docta. (Utrecht), Apotheker (Utrecht)]. **The Medicinal and Poisonous Plants of Southern Africa being an Account of their Medicinal Uses, Chemical Composition, Pharmacological Effects and Toxicology in Man and Animal.**—pp. xx+314. With 12 coloured & 20 black and white illustrations. 1932. Edinburgh: E. & S. Livingstone. [25s.].

The ordinary medical practitioner in any part of the Tropics or Subtropics, confronted with a case of sickness or death known or suspected to be caused by the application or ingestion of part of a plant would be greatly helped in his diagnosis and remedial measures if he had at his command a book of moderate size, giving short, clear and not too technical descriptions of the poisonous plants likely to occur in his area, their distribution and habitat, simple figures of the plants or parts of plants usually

employed, the symptoms caused by them and the active principles responsible, methods of identification microscopical or chemical of ejected or dejected fragments and lines of treatment. As the average practitioner is seldom also an expert botanist a classification of the plants by their main toxicological effects would probably be more convenient than a strictly botanical one. Should his interest extend to the vegetable materia medica used by the natives of his district similar considerations apply.

The production and utility of such guides depend, along with other factors, on the existence in readily available form of a sufficiently extensive and exact body of knowledge regarding the chemistry, pharmacology and toxicology of the plants concerned. Unfortunately for large areas of the warmer regions this is still lacking. There is quite an extensive literature on medicinal and poisonous plants, but much of it is scattered in a host of different periodicals in diverse tongues or in books difficult to obtain.

The present work comes from the Department of Pharmacology of the University of the Witwatersrand, where one of the authors is the Professor of Pharmacology and the other a research worker in the Department, and it is to be welcomed as at least laying down the foundation for the body of knowledge mentioned so far as the greater part of Africa south of the Equator is concerned. It is not a botanical guide as a reader looking only to the title on the book-cover might erroneously infer, for there are no descriptions of the plants nor is their distribution given. Its scope is precisely indicated by its full title.

The expression " Southern Africa " is not defined, but one infers from Appendix II that it covers in addition to the Union of South Africa the Portuguese possessions on both coasts and the British territories outside the Union northwards to over 10°S. Over such a vast area with so many different tribes and such a wealth of species the number of plants known or reputed to be medicinal or poisonous is of course enormous. Some 1,500 species of flowering plants, indigenous and introduced, belonging to over 600 genera and 122 families are dealt with, and a small number of Cryptogams are also included in the survey. Under each species is given what information the authors have collected regarding its medicinal use or its reputed virtues, the tribe or tribes by whom used, the native name or names and if a poisonous plant its effect on man or animal. At the end of each family of plants is a list of the publications consulted.

Lack of precise knowledge of the chemistry and physiological effects of many of the species has compelled a classification of the material under botanical families, an arrangement not very helpful to the average medical man. To compensate in some degree for this the authors have given, in addition to an index of the botanical names, three other copious indices—one of the English and Afrikaans names of the plants and of the diseases caused by them, another of native names and a third of the active principles. In all of these extra indices the botanical name is also given opposite each entry. Those indices should greatly aid not merely the use of the book as a means of obtaining information but also in enabling medical men to add to the knowledge of the aspect of applied—or in the case of poisonous plants misapplied—botany with which the book deals. Further assistance in this latter direction is afforded by Appendix II, which gives a schedule for supplying information and sending specimens to Professor Watt. The volume is well produced and printed, with 26 illustrations, of which 18 are of plants, 12 of these being in colour, and the remainder of cases of poisoning in domestic animals.

The reviewer cordially joins in the hope of the authors that the book will prove a stimulus to medical practitioners in Southern Africa to record cases of poisoning by plants which come their way. Although the work has been considered here more particularly as it is likely to appeal to medical men in Southern Africa, it should also prove a valuable and indispensable book of reference to pharmacologists, toxicologists and others interested, wherever they may be. *A. T. Gage.*

DOBELL (Clifford) [F.R.S., Protistologist to the Medical Research Council, London. Foreign Member of the R. Accademia dei Lincei, Rome. Sometime Fellow of Trinity College, Cambridge]. **Antony van Leeuwenhoek and his "Little Animals." Being Some Account of the Father of Protozoology and Bacteriology and his Multifarious Discoveries in these Disciplines. Collected, Translated, and Edited, from his Printed Works, Unpublished Manuscripts, and Contemporary Records. Published on the 300th Anniversary of his Birth.**—pp. vii + 435. With 32 plates & 4 text figs. 1932. London: John Bale, Sons & Danielsson, Ltd. 83–91 Great Titchfield Street, W.C.1. [31s. 6d.]

Standing in the Old Kirk of Delft, the reviewer once overheard a sight-seer thus address a companion who had paused in passing Leeuwenhoek's tomb—"O, come on! Who ever heard of *him*!" In the hope of lightening the darkness of those who know and care nothing about Leeuwenhoek, and of those more despicable persons who knowing little about Leeuwenhoek write at great length, Mr. Dobell has put together this wonderful volume on a self-taught shopkeeper whom he pronounces, with due proof given, the Father of Protozoology and Bacteriology.

The author was first led to a study of his quaint master by the amazing discovery that the organisms of every group that he, the author, set himself to investigate—protozoa in infusions, protozoa of frogs, spirochaetes, intestinal protozoa of man—had first been seen and described by Leeuwenhoek. But when he attempted to learn something more of the old Hollander from those who claimed to know, he found little more than a maze of inaccuracies and contradictions. No two writers, Mr. Dobell tells us, give the same account of him—even when copying from one another. He found, too, that Leeuwenhoek's "original" Latin texts could not have been written by Leeuwenhoek for the Hollander knew no language except his own. So despairing of finding truth in any easier fashion, the author set himself the stupendous task of learning seventeenth-century Dutch, and also made himself something of a palaeographer. Thus equipped, he collated and translated all Leeuwenhoek's known writings, published and unpublished, on protozoology and bacteriology including the originals in the Royal Society's collection, and reproduces them here in simple English such as Leeuwenhoek might have used had he written in that tongue. These translations are given in full, copiously annotated and explained in the light of modern protozoological and bacteriological knowledge. Nothing less than actual study of this volume can give any adequate idea of the extent and minuteness of the author's researches, not only on Leeuwenhoek's discoveries but on the man himself, his life and the times in which he lived. Leeuwenhoek's name, the form of Dutch he employed, his microscopes and microscopical methods, his draughtsmen, his portraits, are each the subject of a separate and authoritative section, while the beautifully reproduced plates of M.S. facsimiles, portraits, etc., add greatly to the value and interest of the work.

No one with any interest in the history of science, or in history for its own sake, should fail to read this fascinating account of an extraordinary man; an account, moreover, which stands out as a model of exact, laborious and indefatigable research. *W. P. MacArthur.*

SERGENT (Edmond) & SERGENT (Etienne). **L'armée d'Orient délivrée du paludisme.** Préface du Dr. ROUX.—92 pp. With numerous illustrations. 1932. Paris: Masson et Cie. [25 fr.]

This small volume tells in a breezy style how the French Army in Salonica was saved in 1917 from a repetition of the débâcle of 1916. In 6 months of the latter year there were 60,000 cases of malaria and by the autumn a bare 20,000 men remained in the line. General Sarrail writes: "Mon armée est immobilisée dans les hôpitaux." A year later he is able

to boast: "There has been much less fever than last year—three times less amongst our 180,000 troops than amongst the British with only 120,000."

Probably such a statement would not face the batteries of the modern statistician, but, at least, it betrays an amiable satisfaction on the part of the Commander-in-Chief.

The book relates how this sanitary revolution took place. No effort is made to give details; it is a human document consisting of brief episodes embellished by thumb-nail sketches in black and white, which one may read with pleasure in a deck chair on a hot afternoon.

In the twinkling of an eye a Staff Officer is converted to the worship of Hygeia, a village outlawed for its splenic index, the smiles of a lusty trooper turned to tears at the vision of wife and children bereft by his neglect of quinine and mosquito net.

A Mission is appointed to carry the gospel of sanitation. Quinine, mosquito nets, healthy camping grounds—such is the trinity of salvation which they preach. But especially quinine, which enables a man to defy the parasite and keep in the line.

Behind them is the whole power of military discipline—to evade the daily dose is equivalent to desertion in the face of the enemy. And ever on the track of such defaulters the Mission harries the troops with Tanret's solution. No one is safe—into the trenches, rest billets and battery emplacements they go with their test tubes and pipettes, demanding immediate delivery of adequate samples. There is a note of pathos in the plaint: "A tout moment revenait son surnom: 'La grande . . . urineuse?'"

But alas, human nature being what it is, even Medical Officers do not always share this enthusiasm for standard prevention. Evidently the French doctors in Salonica were no exception, for at the end of September, 1917, we find them being heavily reprimanded in an Army Order for voicing a certain lack of confidence in the measures which had been adopted—"The Orders are to be carried out without discussion." C'est la guerre!

We may, however, congratulate the authors upon the high measure of success which they claim. *S. H. Daukes.*

EDGE (P. Granville) [Division of Epidemiology and Vital Statistics, London School of Hygiene and Tropical Medicine]. **Vital Records in the Tropics.**—pp. xi + 167. With 1 plate & 9 figs. 1932. London: George Routledge & Sons, Ltd., Broadway House, 68–74, Carter Lane, E.C. [7s. 6d.]

This book is reviewed in *Bulletin of Hygiene*, 1932, Vol.7, p. 535.

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INDEX OF AUTHORS OR SOURCES.

The bracketed abbreviations after the page numbers indicate the subjects.
Page numbers within brackets indicate papers not summarized.

Am. signifies Amoebiasis and Amoebic Dysentery.
Bb. ,, Beriberi and Epidemic Dropsy.
Bl. ,, Blackwater.
B.R. ,, Book Review.
Chl. ,, Cholera.
C.Bu. ,, Climatic Bubo and Lymphogranuloma Inguinale.
Der. ,, Tropical Dermatology.
Dys. ,, Dysentery (Bacillary and Unclassed).
Fev. ,, Fevers.
G.V. ,, Granuloma Venereum.
Hel. ,, Helminthiasis.
Hist. ,, Historical.
H.S. ,, Heat Stroke.
K.A. ,, Kala Azar.
Lab. ,, Laboratory Reports.
Lep. signifies Leprosy.
Lept. ,, Leptospirosis.
Mal. ,, Malaria.
Misc. ,, Miscellaneous.
Myc. ,, Tropical Mycology.
Oph. ,, Tropical Ophthalmology.
Pel. ,, Pellagra.
Pl. ,, Plague.
Rab. ,, Rabies.
R.B.F. ,, Rat-Bite Fever.
R.F. ,, Relapsing Fever and other Spirochaetoses.
Sp. ,, Sprue.
S.S. ,, Sleeping Sickness.
Und. ,, Undulant and Abortus Fever.
Y.F. ,, Yellow Fever.
Y. & S. ,, Yaws & Syphilis.
Z. ,, Medical Zoology.

A

Aalsmeer, W. C., 614, (618) (Bb.)
—— & Richter, C. S., 92 (Bb.)
Aars, C. G., 276 (Der.)
—— & Nielsen, F. O., 387 (Y. & S.)
Abadjieff, B., 602, 603 (Rab.)
Abbatucci, S., (538) (Misc.), 744 (Hel.)
Abrahams, A., 248 (B.R.)
Abrami, P., Grégoire & Wallich, R., 499 (K.A.)
Abuel, J. I., with Cruz & Samson, 549 (Lep.)
Achundow, I., 475, 480 (Z.)
Acton, H. W., 803 (Misc.)
—— & McGuire, C., 273 (Der.)
Adams, J. M., 351 (Mal.)
Adant, M., 269, 850 (Lep.), 702 (Mal.)
Adelheim, R., 603 (Rab.)
Adler, S. & Theodor, O., 103, 505, 872 (K.A.)
Advier, 40 (Hel.), (93) (Bb.), 678, 679 (Pl.)
Africa, C. M., 425 (Hel.), 862 (Der.)
Agostini, A., 323 (Myc.)
Aguessy, C. D., with Pettit, 576 (Y.F.)
Ahuja, M. L., with Maitra, 170 (Z.), 380, 381 (Chl.)
Aida, T., with Kiribayashi, 682 (Chl.)
Aitken, I. M. M., 283 (S.S.)
Akashi, K., with Nomura, 442 (Fev.)
Akil-Mouktar, 39 (Hel.)
Alain, with Guyomarc'h & Toullec, 703 (Mal.)
——, with Toullec, 637 (S.S.)
——, with —— & Jolly, (364) (Mal.)
Albert, J., 611 (Bb.)
Alessandrini, A., Pampana, E. & Sabatucci, M., 398 (B.R.)
Alessandrini, M., (720) (Mal.)
Alessandro, A., 714 (Mal.)
Alexeieff, A., (259) (Am.)
Amagasaki, M., with Kobayashi, 844 (Lep.)
Ambrogio, A., 553 (Lep.)
Amies, C. R., with Kingsbury, 359, (720) (Mal.)
Amsterdam: Bureau d'Encouragement pour l'Emploi de la Quinine, 346 (Mal.)
Anazawa, K., 340 (Mal.)
Anders, H. E., 390 (C.Bu.)
——, with Meyer, 729 (C.Bu.)
Anderson, C., 557 (R.F.)
——, with Nicolle, 556 *bis*, (565) (R.F.)
——, with —— & Laigret, 557 (R.F.)
Anderson, D., 476, 477 (Z.)
Anderson, H. H., (86) (Hel.)
——, with David, Koch & Leake, 473 (Z.)
—— & Reed, A. C., (259) (Am.)
——, with ——, David & Leake, 583 (Am.)
Anderson, L. A. P., 183 (Lab.)
Anderson, N. P. & Ayres, S., Jr., 278 (Der.)
——, with —— & Youngblood, 326 (Myc.)
—— & Spector, B. K., 570 (R.B.F.)
Anderson, R. J., with Uyei, 552 (Lep.)
Anderson, W. E., 255 (Am.)
Anding, C. & Sinani, A., 99 (Pel.)
Ando, K., Kurauchi, K. & Nishimura, H., 369 (Pl.)
Andre, Z., 502 (K.A.)
Andrews, J., 353 (Mal.)
Angelo, A., with Joannides & Papagheorghiou, 329 (Myc.)
Anglade, Gaudin, O. & Arcony, 408 (Hel.)
Annales de Médecine et de Pharmacie Coloniales, 89 (Bb.)

Annecke, S., with Schüffner, Swellengrebel & de Meillon, 693 (Mal.)
——, with Swellengrebel & de Meillon, (364) (Mal.)
Antonelli, G., (259) (Am.)
Antwerp, 811 (Misc.)
Aoki, T., 265 (Lep.)
Appel, (375) (Pl.)
Aragão, H. de B., 201, 573 (Y.F.)
de Araujo, E., 91 (Bb.), 213, (570) (R.B.F.), (725) (Y. & S.)
de Araujo, E. L. F., (93) (Bb.)
Arbona, A., 708 (Mal.)
Arce, J., 797 (Fev.)
Archer, V. W., with Morton, 417 (Hel)
Archibald, R. G. & Marshall, A., 44, 741 (Hel.)
Archives des Instituts Pasteur d'Indochine, 338 (Mal.), 522 *bis* (Misc.)
Archives de l'Institut Pasteur de Tunis, 181 (Lab.)
Arcony, with Anglade & Gaudin, 408 (Hel.)
Arène, with de Lagoanère, (363) (Mal.)
Arenas, R., with Kouri, 744, 745 (Hel.)
Arias Aranda, C., with Mazza, 117, (120) *bis* (K.A.)
—— & Rosa, A., 117 (K.A.)
Arnaud, J. & Raybaud, A., 372 (Pl.)
Arnaud, R., 754 (Hel.)
Artamonov, A. S., 119 (K.A.)
Arthus, M., 161 *bis*, 492, 854 (Z.)
Ashford, B. K., 3, 7 (Sp.), 526 (Misc.), (863) (Der.)
——, with Kesten, Benham, Emmons & Moss, 860 (Der.)
—— & Pons, J. A., 462 (Sp.)
Ashley, J. N., with Browning, Cohen & Gulbransen, 659 (S.S.)
Aslett, E., with Willoughby, (120) (K.A.), 800 (H.S.)
Assali, J., 43 (Hel.)
Assatourow, A. G., 746 (Hel.)
Asselin (362) (Mal.)
Atkey, O. F. H., 226, 805 (Misc.), 555 (R. F.)
Aubertin, C., (720) (Mal.)
Aubin & Nadessin, 81 (Hel.)
Auchincloss, H., 78 (Hel.)
Auclair, J., with Levaditi & Vaisman, 561 (R.F.)
Audain, L., with Coutelen, 46 (Hel.)
Augagneur, 278 (Der.)
Aujeszky, A., 607 (Rab.)
d'Aunoy, R. & Beven, J. L., 193 (Rab.)
Austin, C. J., 263 *bis*, 543 (Lep.)
Avari, C. R., with Naidu, 675 (Pl.)
Aykroyd, W. R., 615 (Bb.)
Ayres, S., Jr., with Anderson, 278 (Der.)
——, —— & Youngblood, E. M., 326 (Myc.)
Ayuyao, C. D., with Ubaldo, 857 (Oph.)
Azmy, S., 411 (Hel.)

B

Bablet, J., (720) (Mal.)
—— & Marneffe, H., 598 (Rab.)
Bach, F. W., 580 (Am.)
Bachman, G. W. & Rodriguez-Molina, R., 761 (Hel.)
Bacigalupo, J., 54, (432), 746 (Hel.)
Badger, L. F., 264 (Lep.)
——, with Ceder, Dyer & Rumreich, 447 (Fev.)
——, with Dyer, Ceder, Lillie & Rumreich, 446 (Fev.)
——, with ——, —— & Rumreich, 16, 446 (Fev.)
——, with ——, ——, Workman & Rumreich, 447 (Fev.)
——, with —— & Rumreich, 444 (Fev.)
——, with ——, Workman, Ceder & Rumreich, 777 (Fev.)
——, with ——, Workman & Rumreich, 777 (Fev.)
Baer, J. G., with Joyeux, 405 (Hel.)
——, with —— & Houdemer, 749 (Hel.)
Bailby, J., 90 (Bb.)
Bailly, J., with Remlinger, 189, 193, 194, 596, 597, 599, 607 *ter* (Rab.)
——, with —— & Manouélian, 605 (Rab.)
——, with —— & Palmowitch, 189, 190, 192 *bis* (Rab.)
Baily, J. D., with Covell, 335 (Mal.)
Baisas, F. E., (163) (Z.)
Baize, P., with Lereboullet & Chabrun, 115 (K.A.)
Baker, C. E., 492 (Z.)
Baldwin, A. H., 803 (Misc.)
Balfour, M. I., 516 (Misc.)
Ball, G. H., 820 *bis* (Z.)
Ballif, L., with Ciuca & Balteanu, 354 (Mal.)
—— & Ornstein, I., 622 (Pel.)
Balozet, L., 327 (Myc.)
——, with Nicolle, 598 (Rab.)
Balteanu, I., with Ciuca & Ballif, 354 (Mal.)
Banerjea, R., with Brahmachari, U. & Brahmachari, P., 661 (Bl.)
Banerji, N. D., 235 (Misc.)
Banks, W. B. C., 460 (Und.)
Barbeau, L. G., 180 (Lab.)
Barber, M. A., 689 (Mal.)
—— & Olinger, M. T., 331 (Mal.)
——, Rice, J. B. & Brown, J. Y., 686 (Mal.)
Barberi, R., 52 (Hel.)
Bardet, J., with Levaditi, Tchakirian, & Vaisman, 291 (S.S.)
Barlow, C. H., 36 (Hel.)
Barneoud, J., (432) (Hel.)
Baroni, V. & Michail, D., 435 (Oph.)
Barraud, P. J., (163) (Z.)
—— & Christophers, S. R., (163) (Z.)
——, with ——, 136 (Z.)
Barreto, C., (362) (Mal.)
Barrett, J. W., 847 (Lep.), 857 (Oph.)
Barrett, R. E., 282 (S.S.)
Barsukowa, O., with Lenskaja, Egorow, Siwolobow, Larionowa, Marjina, Lebedewa, & Dikow, 375 (Pl.)
Basu, B. C., with Knowles & Gupta, 592 (B.R.)
Basu, N. K., 313 (Misc.)
Bath, C. H., 130 (Z.)
Battisttini, T., 30 (Fev.)
Bauer, J. H., 197, 574 (Y.F.), 204 (Lept.)
Bauer, W., with Marble, 6 (Sp.)
Baumgartner, E. A. & Hubbard, R. S., 9, 10 (Sp.)
——, with Thomas, 467 (Sp.)

Bauvallet, H., 225 (Misc.)
Baylis, H. A., 408, 416 (Hel.)
Bearup, A. J., 63 (Hel.)
Beauchesne, H., with Laederich, Levaditi & Mamou, 730 (C.Bu.)
Becker, F. E., (458) (Fev.)
Becker, G., 50 (Hel.)
Bédier, E., with Nattan-Larrier & Noyer, 651 (S.S.)
Beeuwkes, H. & Hayne, T. B., 196 (Y.F.)
Behdjet, H., 505 (K.A.)
Beijnen, G. J. W. K., 462 (Sp.)
Beintema, K., 272 (Der.)
Belfanti, S., (93) (Bb.)
Benarroch, E. I., 342 (Mal.), 593 (B.R.)
Benavides, J., with Clark & Dunn, 208 (R.F.)
Benedict, F. G., with Mason, 234 (Misc.)
Benham, R. W., with Kesten, Ashford, Emmons & Moss, 860 (Der.)
Benhamou, E., Gille, R. & Nouchy, A., 115 (K.A.)
Bensaude, R. & Lambling, A., (393) (C.Bu.)
Bequaert, J. C., with Strong & Cleveland, 484 (Z.)
Berberian, D. A., with Yenikomshian, 755 (Hel.)
v. Berkesy, L., (362) (Mal.)
Bernard, P. N., 609 (Bb.)
Bernasconi, V., with Mazza, Niño, & Quintana, (330) (Myc.)
Beron, B., 274 (Der.)
Berry, G. P. & Kitchen, S. F., 571 (Y.F.)
Besançon, J., with Labbé, Boulin & Petresco, 328 (Myc.)
Bessemans, A. & Thiry, U., (205), (568) (Lept.)
Bessonowa, A., 375 (Pl.)
Beunders, B. J. W., 561 (R.F.)
Beven, J. L., with d'Aunoy, 193 (Rab.)
Bevier, G., with Peña Chavarría & Serpa, 202 (Y.F.)
Bhandari, A. D., 849 (Lep.)
Bhatia, B. B., with Vyas, (721) (Mal.)
Biggam, A. G., (362) (Mal.)
——, Halawani, A. & Ragab, A., 256 (Am.)
—— & Ragab, A., (259) (Am.)
Bishop, E. L., with Keller & Leathers, 737 (Hel.)
Blackie, W. K., 61, 401 (Hel.), 314 (Misc.)
Blacklock, D. B., 820 (Z.)
—— & Lourie, E. M., 110 (K.A.)
—— & Southwell, T., 165 (B.R.)
Blanc, G. & Caminopétros, J., 21, 22 *bis*, 23 *bis*, 24, 458, 793 (Fev.), 110 (K.A.)
Blanchard, M., (213) (R.F.), 285 (S.S.)
——, with Olmer & Botreau-Roussel, (260) (Am.)
Blanchard, V., with Turner, 98 (Pel.)
Blaschin, A. N., 37 (Hel.)
Bliss, S., 97 (Pel.)
Blohina, Z. A., with Kostyleff, 33 (Hel.)
Boas, A., with Buschke & Vasarhelyi, 388 (C.Bu.)
Bobes, S., 193 (Rab.)
Boez, L., Guillerm, J. & Marneffe, H., 267 (Lep.)
Boggian, B., 537 (Misc.)
Boisseau, R., with Vaucel, 286 (S.S.)
——, with —— & Salaun, 597 (Rab.)
Bokalo, A., Wedischtschew, S., Sabinin, A., Jegorow, A. & Grikurow, W., 679 (Pl.)
Bombay, 183 (Lab.)
Bonacci, H., (306) (S.S.)
Bonalberti, E., (362) (Mal.)
Boncinelli, U., with Reitano, (795) (Fev.)
Bonelli, P., (86) (Hel.)
Bongiovanni, V., (458) (Fev.)
Bonne, C., 532 (Misc.)
——, Kouwenaar, W., Müller, H. & Vos, J. J. T., 242 (Misc.)
——, with Mulder & Sardjito, 204 (Lept.)
Bonne-Wepster, J. & Brug, S. L., 836 (Z.)
Bonnet, P., 490 (Z.)
Bonnin, H., (320) (Misc.)
Boquien, Y., with Troisier, (565) (R.F.)
Bordes, L. A., 338 (Mal.)
——, with Mesnard, (363) (Mal.)
—— & Nguyen-van-Lieng, (362) (Mal.)
Borghi, B., with Schilling, 300 (S.S.)
Bornand, M., with Galli-Valerio, 47 (Hel.)
Borrego, C. & Campo Posada, A., 119 (K.A.)
Borrien, H., with Marquézy & Monnier, 499 (K.A.)
Bos, A., with Nieschulz, (163) (Z.)
Bosch, W. G., (100) (Pel.)
Botreau-Roussel, P., with Olmer & Blanchard, (260) (Am.)
Boucher, H., 740 (Hel.)
Boucher, L., (771) (Hel.)
Bouffard, (244) (Misc.)
Boulin, with Labbé, Besançon & Petresco, 328 (Myc.)
Bourguel, A., 282 (S.S.)
Bourguignon, G. C., 343 (Mal.)
—— & Peel, E., (362) (Mal.)
Bousquet, A., 41 (Hel.)
Bovet, D., 127 (Z.)
Boyd, J. E. M., (720) (Mal.)
Boyd, T. C., Napier, L. E. & Roy, A. C., 312 (Misc.)
Boyé, 270 (Lep.)
Bradford, W. L., with Miller, Jr. & McCoy, 764 (Hel.)
Bradley, G. H., 481, 828 (Z.), 689 (Mal.)
Brahmachari, P. & Brahmachari, U., 112 (K.A.)
——, with —— & Banerjea, 661 (Bl.)
Brahmachari, U., Brahmachari, P. & Banerjea, R., 661 (Bl.)
Braithwaite, E. C., 235 (Misc.)
Branchini, B., 598 (Rab.)
v. Brand, T., 471 (Z.)
—— & Regendanz, P., 299 (S.S.)
Brás de Sá, with de Mello, 359 (Mal.)
de Brauwere, P. & Lisfranc, J., 653 (S.S.)
Brazzaville, 178 (Lab.)
Breinl, F., (469) (B.R.)
Breitländer, K., 329 (Myc.)
Brennan, T. J., 612 (Bb.)
Brewster, K. C., 252 (Am.)
——, with Thonnard-Neumann & Moya, 324 (Myc.)
Breyerbrandwijk, M. G., with Watt, 879 (B.R.)
Brighenti, D., 346 (Mal.)
Brink, C. D., (259) (Am.)
British Empire Leprosy Relief Association, 543 (Lep.)

British Mosquito Control Institute, 130 (Z.)
Broc, 498, 500, (507) (K.A.)
Brooke, P. A. & Goodale, R. H. (259) (Am.)
Broom, J. C. & Findlay, G. M., 453 (Fev.)
Brosius, O. T., (120) (K.A.), (863) (Der.)
Brown, E. K. & Cleveland, A. J., 567 (Lept.)
Brown, H. W., 58 (Hel.)
——, with Lamson, Caldwell & Ward, 56, 407 (Hel.)
——, with ——, Robbins & Ward, 56 (Hel.)
Brown, J., (259) (Am.)
Brown, J. Y., with Barber & Rice, 686 (Mal.)
Brown, P. W. & Osterberg, A. E., 256 (Am.)
Browning, C. H., Cohen, J. B., Ashley, J. N. & Gulbransen, R., 659 (S.S.)
——, ——, Cooper, K. E. & Gulbransen, R., 294, 645 (S.S.)
Bruck, R., 143 (Z.)
Brug, S. L., 76 *bis*, (86), 767 (Hel.), 825 (Z.)
——, with Bonne-Wepster, 836 (Z.)
Brulé, 71 (Hel.)
——, Lièvre, J. A. & Tsatsaronis, (568) (Lept.)
Brumpt, E., 48 *bis*, 406, 412 (Hel.), 773 *bis* (Fev.)
Brun, C., with Vaudremer & Sézary, 550 (Lep.)
Brussin, A. M., with Kritschewski, 209 (R.F.)
Bruyn, D., with Delamare & Gatti, 525 (Misc.)
Buchanan, J. C. R., 275 (Der.), 617 (Bb.)
——, with Connell, 771 (Hel.)
Büchner, S., (771) (Hel.)
de Buck, A., Schoute, E. & Swellengrebel, N. H., 345 (Mal.)
——, with Swellengrebel, 357 (Mal.), 479 (Z.)
Buckley, J. J. C., 60 (Hel.)
de Buen, E., 832 (Z.)
Bujanowskaja, I. S., with Jermoljewa, 356 (Mal.)
Bulletin de l'Académie de Médecine, (320) (Misc.)
Bulletin Office International d'Hygiène Publique, 674 (Pl.)
Burke, A. M. B., with Hoffman & Marin, 768 (Hel.)
Burke, G. T., (720) (Mal.)
Burke-Gaffney, H. J. O'D., 176 (Lab.)
Burket, J. A. (565) (R.F.)
Burnet, E., 542 (Lep.)
Burnet, F. M., McKie, M. & Wood, I. J., 586 (Dys.)
Burnie, R. M., 235 (Misc.)
Burova, L., with Kassirsky, 619 (Pel.)
Burowa, L. F. & Kassirsky, I. A., 670 (B.R.)
Burton, A. W. (538) (Misc.)
Buschke, A., Boas, A. & Vasarhelyi, 388 (C.Bu.)
Butcher, D., with Napier & Gupta, 709 (Mal.)
Butler, C. S., 388, (725) (Y. & S.)
Butler, G. G., 178 (Lab.), 349 (Mal.), 384 (Y. & S.)
——, with Summerhayes, G. M. L., 383 (Y. & S.)
Buttiaux, R. & Sevin, A., 243 (Misc.)
Buxton, P. A., 128, 129, 154, 838 (Z.)
Byrne, J., 578 (Y.F.)

C

Caballero y C., E., (86) (Hel.)
Cabreza, J. & Tirona, J. P., 403 (Hel.)
Cachera, R., with Levaditi, Ravaut & Lépine, 392 (C.Bu.)
Caius, J. F., with Mhaskar, 162 (Z.)
Calcutta, 228, 803 (Misc.)
Caldwell, E. L., with Lamson, Brown & Ward, 56, 407 (Hel.)
Caldwell, F. C. & Caldwell, E. L., 422 (Hel.)
Caldwell, R. J., with Cushing, 445 (Fev.)
Cambers, J. H., with Turner, 723 (Y. & S.)
Cameron, T. W. M., 48 (Hel.)
Cameron, W. M., with Wigmore, 114 (K.A.)
Caminopétros, J., with Blanc, 21, 22 *bis*, 23 *bis*, 24, 458, 793 (Fev.), 110 (K.A.)
——, with Lépine, 776 (Fev.)
——, with —— & Pagonis, 566 (Lept.)
——, with —— & Pangalos, 775 (Fev.)
——, Phylactos, A. & Photakis, B., 727 (C.Bu.)
Caminopetros, T., (568) (Lept.)
Cammarata, A., 116 (K.A.)
Campbell, H. G. M., with Napier, 700 (Mal.)
——, with Shortt & Lal, 865 (K.A.)
van Campenhout, J., 221 (Misc.)
Campo Posada, A., with Borrego, 119 (K.A.)
Campunaud, (362) (Mal.)
Canaan, T., 266 (Lep.), 497 (K.A.)
Canal-Feijóo, E. J., 464 (Sp.)
——, with Mazza, (278) (Der.)
Cannavo, L., (795) (Fev.)
Cannon, P. R., with Taliaferro & Goodloe, 126 (Z.)
Cantacuzène, J. & Longhin, S., 550 (Lep.)
Cany, G., (244) (Misc.)
Cardamatis, J. P., 140 (Z.), (362) (Mal.)
Carman, J. A., 414 (Hel.)
Carnes, E. H., 487 (Z.)
Carrillo, F., Fernández, J. M. M. & Schujman, S., 264 (Lep.)
Carrión, A. L., 153, 487 (Z.)
Carron, B., with Gaudin, 408 (Hel.)
Carter, H. R., 245 (B.R.)
de Carvalho, J., 822 (Z.)
Carvalho, P. E. de O., with Vampré, 194 (Rab.)
Caspari, J., (587) (Am.)
Casparis, H., with Keller & Leathers, (86) (Hel.)
Cassoute, Giraud, P. & Trabuc, F., 869 (K.A.)
Castellani, A., 308 (Misc.), 406 (Hel.)
de Castro, A. B., 119 (K.A.)
Catanei, A., 323, 324 *bis* (Myc.), 859 *bis* (Der.)
—— & Legroux, C., 329 (Myc.)
——, with Montpellier & Lefranc, 329 (Myc.), 861 (Der.)
——, with Sergent, Edm., Sergent, Et. Parrot, Foley & Senevet, 332 (Mal.)
Catsaras, J., (15) (Fev.)
Cattan, R., with Troisier, 24 (Fev.)
——, with —— & Sifferlen, 457 (Fev.)
Cattaneo, D., 436 (Oph.)
Cawston, F. G., 42, 43, (86) (Hel.), (320) (Misc.), (720) (Mal.)
Cazanove, 89 (Bb.), 571 (Y.F.), 823 (Z.)

Ceder, E. T., with Dyer, Lillie, Rumreich & Badger, 446 (Fev.)
——, ——, Rumreich, A. & Badger, L. F., 447 (Fev.)
——, with ——, —— & ——, 16, 446 (Fev.)
——, with ——, Workman, Rumreich & Badger, 447 (Fev.)
——, with —— Workman, —— & Rumreich, 777 (Fev.)
Chabrun, J., with Lereboullet & Baize, 115 (K.A.)
Chadwick, C. R., with MacHattie, 744 (Hel.)
——, with —— & Mills, 117 (K.A.)
——, with Mills & Machattie, 505 (K.A.)
Chahed, L., 499 (K.A.)
Chaillot, L. & Saunie, L., 119 (K.A.)
Chambers, J. H., with Turner, 723 (Y. & S.)
Chandler, A. C., 738 (Hel.)
Chappaz & Thierry, 531 (Misc.)
Chatterji, S. N., with Muir, 847 (Lep.)
Chaudhury, S. G., with Chopra, 870 (K.A.)
——, with —— & De, 110 (K.A.)
Chen, F. K., with Kurotchkin, 321 (Myc.)
——, —— & Hu, C. K., 322 (Myc.)
Chen, S. M., van Gorder, G. W. & Yuan, Y. K., 253 (Am.)
Ch'eng, C. C., 116 (K.A.)
Chenoy, C. F., with Walker & Rao, 486 (Z.)
Chesterman, C. C., 638 (S.S.)
Ch'iang, I. H., with Chu, 406 (Hel.)
Chiba, E. & Kuwabara, N., 124 (Z.)
——, with Tanabe & Kuwabara, 124 (Z.)
Ch'in, T. L., 527 (Misc.)
Ch'in, Y. L., with Kurotchkin, 321 (Myc.)
China Medical Journal, 261 (Lep.)
Chinese Medical Journal, (679) (Pl.)
Chiyuto, S. & Velasco, F., 546 (Lep.)
Chodukin, N. J., Sofieff, M. S., Schevtschenko, F. J. & Radsivilovskij, G. L., 116 (K.A.)
Chopra, R. N. & Chaudhury, S. G., 870 (K.A.)
——, —— & De, N. N., 110 (K.A.)
—— & Chowhan, J. S., 170, 816 (Z.)
—— & Iswariah, V., 170 (Z.)
—— & Mukherji, B., 529, 530 (Misc.)
Chorine, V., with Marchoux, 559 (R.F.), 817 (Z.)
Chowdhury, K. L., 136 (Z.)
——, with Strickland, 137 (Z.)
Chowhan, J. S., with ——, 170, 816 (Z.)
Choy, P. D. & Ludlow, A. I., 47 (Hel.)
Christian, E. B. with Lowe, 545 (Lep.)
Christophers, S. R., 136 (Z.)
—— & Barraud, P. J., 136 (Z.)
——, with ——, (163) (Z.)
—— & Puri, I. M., 137 (163) (Z.)
Chu, H. J. & Ch'iang, I. H., 406 (Hel.)
Chukerbuti, J. C., (362) (Mal.)
Chung, H-L., 116 (K.A.)
Cilento, R. W. & North, E. A., 551 (Lep.)
Ciuca, Balteanu, I. & Ballif, L., 354 (Mal.)
Ciuca, M., (720) (Mal.)
Ciurea, I. & Stephanescou, T., 277 (Der.)
Clark, H. C. & Dunn, L. H., 655 (S.S.)
——, —— & Benavides, J., 208 (R.F.)
—— & Komp, W. H. W., 689 (Mal.)
Clark, J. T., (538) (Misc.)
Cleland, J. B., 474, 821 (Z.), (538) (Misc.)
Clément, 185 (Lab.)
Clemesha, W. W., 358 *bis* (Mal.)
Cleveland, A. J., with Brown, 567 (Lept.)
Cleveland, L. R., with Strong & Bequaert, 484 (Z.)
Cluver, E. H., 798 (H.S.)
Cobb, N. A., 55 (Hel.)
Cochrane, R. G., 270, 846 (Lep.)
Codazzi Aguirre, J. A., 506 (K.A.)
Cohen, A., (659) (S.S.)
——, King, H. & Strangeways, W. J., (659) *bis* (S.S.)
Cohen, J. B., with Browning, Ashley & Gulbransen, 659 (S.S.)
——, ——, with Cooper & Gulbransen, 294, 645 (S.S.)
Colas-Belcour, J., 152 (Z.)
——, with Roubaud, 489, 835 *bis* (Z.)
Cole, A. C., Jr., 842 (Z.)
Cole, H. I., 548 (Lep.)
Collier, W. A., 292 (S.S.)
Colombani, 371 (Pl.)
Colombo, 736 (Hel.)
Colombo, U., (720) (Mal.), 813 (Misc.)
Colonie du Congo Belge, 214 (Misc.)
Colonieu, L., 119 (K.A.)
Combiesco, D., 456 *bis*, 794 (Fev.)
—— & Zotta, G., 455 (Fev.)
Connell, W. K., 386 (Y. & S.)
—— & Buchanan, J. C. R., 771 (Hel.)
Consoli, N., (362) (Mal.)
Constantakato, G., with Livierato & Vagliano, 716 (Mal.)
Constantinesco, N., 560 (R.F.)
Constantinesco, V., with Nicolau & Mathis, 597 (Rab.)
Cook, S. S., 688 (Mal.)
Cook, W. W., 512 (Misc.)
Cooke, W. E., with Rogers, 465 (Sp.)
Cooper, G. W., (538) (Misc.)
Cooper, K. E., with Browning, Cohen & Gulbransen, 294, 645 (S.S.)
Copanaris, P., 846 (Lep.)
Corbett, G. H. & Hodgkin, E. P., 528 (Misc.)
Cordes, W., 63 (Hel.)
Corfield, C. R., 319 (Misc.)
Corinaldesi, S., 25 (Fev.)
Cormack, E. A. (538) (Misc.)
Cornbleet, T., 326 (Myc.)
Cornet, E., 856 (Oph.)
Corona, F., 498 (K.A.)
Corpus, T., 376 *bis* (Chl.)
Corson, J. F., 300, 634, 635 *bis* (S.S.), 837 (Z.)
Cort, W. W., 59 (Hel.)
——, with Foster, 762 (Hel.)
——, with Otto, 64 (Hel.)
——, with —— & Keller, 56 (Hel.)
—— & Stoll, N. R., 416 (Hel.)
Coulon, G. & Dinulescu, G., 150 (Z.)
—— & Sautet, J., (362), (720) (Mal.), 490 (Z.)
Coulter, J. L. S., with Drake, (771) (Hel.)
Coutelen, F., 53 *bis* (Hel.)
—— & Audain, L., 46 (Hel.)
Couvy, (375) (Pl.)
Couvy, L., 677 *bis* (Pl.)
——, Lambert, L. & Dufour, V., 676 (Pl.)
Covell, G., (163), 478 (Z.)

Covell, G., & Baily, J. D., 335 (Mal.)
Cowan, T. A., 850 (Lep.)
Craig, C. F., (587) (Am.), 770 (Hel.)
Craven, W. J. & Co., Ltd., 361 (Mal.)
van Creveld, S., (86) (Hel.)
Crimmins, M. L., 169 (Z.)
Croveri, P., (120) (K.A.)
Crumrine, R. M. & Kessel, J. F., 534 (Misc.)
Cruveilhier, L., with Nicolau & Kopciowska, 601 *bis* (Rab.)
Cruz, M. C., Abuel, J. I. & Samson, J. G., 549 (Lep.)
Cruz, W. O., 760 (Hel.)
Cuboni, E., (843) (Z.)
——, with Milani, 354 (Mal.)
Cumming, H. S., 202 (Y.F.)
Cummings, B. F., 842 (Z.)
da Cunha, A. M., 507 (K.A.)
Curry, D. P., (163) (Z.)
Cushing, H. B. & Caldwell, R. J., 445 (Fev.)

D

Daengsvang, S., 756 (Hel.)
——, with Foster, 762 (Hel.)
Dardenne, 222 (Misc.)
Dargein & Plazy, (259) (Am.)
Dau, H., with Pijper, 452, 779 (Fev.)
Daubney, R., with Findlay, 453 (Fev.)
—— & Hudson, J. R., 453 (Fev.)
Davey, T. H., with Gordon, 695 (Mal.)
David, J. C., with Iswariah, 852 (Z.)
David, N. A., Anderson, H. H., Koch, D. A. & Leake, C. D., 473 (Z.)
——, with Reed, Anderson & Leake, 583 (Am.)
David, V. C., 393 (C.Bu.)
Davis, G. E. & Philip, C. B., 132 (Z.)
Davis, N. C., 139, 836 (Z.)
——, with Frobisher, Jr. & Shannon, 196 (Y.F.)
—— & Kumm, H. H. W., 697 (Mal.)
—— & Shannon, R. C., 197 (Y.F.)
Dawson, W. T. & Newman, S. P., 352 (Mal.)
De, M. N., with Shanks, 113 (K.A.), 616 (Bb.)
De, N. N., with Chopra & Chaudhury, 110 (K.A.)
de Decker, 665 (Bl.)
Decourt, P., 352 (Mal.)
Déjou, L., 84 (Hel.)
De la Camara, P., 497 (K.A.)
Delamare, G. & Gaona, R. J., (554) *bis* (Lep.)
—— & Gatti, C., 329 (Myc.), 506 (K.A.), 564, 565 (R.F.)
——, —— & Bruyn, D., 525 (Misc.)
——, —— & Gonzalez, D., 873 (K.A.)
Delanoë, E., 862 (Der.)
Delanoë, P., 209, 556, 557 *bis* (R.F.)
De la Torre, I., 429 (Hel.)
Delbreil, J., 659 (S.S.)
Delorme, 188 (Rab.)
Delorme, M., with Wilbert, 157 (Z.)
De los Rios, M., with Mazza, 119 (K.A.), (330) (Myc.)
——, with —— & Quintana, (278) (Der.)
Del Ponte, E., 155 (Z.)
Del Toro, J., Pons, J. A. & Rodríguez Molina, R., 78 (Hel.)
Demidowa, L. W., with Kritschewski, 561 (R.F.)
Denes, G., 355 (Mal.)
Denney, O. E., 541 (Lep.)
Deschiens, R., (587) (Am.)
Des Essarts, J. Q., 776 (Fev.)
—— & Prade, J. V., 456 (Fev.)
Dévé, F., 52 (Hel.)
Dey, N. C., with Fitzgerald, 385, 722 (Y. & S.)
Dias, E., 657 *bis* (S.S.)
Dickinson, P. S., 564 (R.F.)
Dikow, A., with Lenskaja, Egorow, Siwolobow, Larionowa, Marjina, Lebedewa, & Barsukowa, 375 (Pl.)
Dikshit, B. B., 547 (Lep.)
—— & Rao, D. K., 501 (K.A.)
Dinger, J. E., 201 (Y.F.)
——, Schuefiner, W. A. P. & Snijders, E. P., (203) (Y.F.)
—— & Snijders, E. P., 14 (Fev.)
——, with —— & Schüffner, 12 *bis* (Fev.)
Dinulescu, G., with Coulon, 150 (Z.)
Dixey, M. B. D., 263 (Lep.)
Dixon, P. K., 435 (Oph.)
Dobell, C., 881 (B.R.)
Doering, C. R., with Earle, 423 (Hel.)
Dollfus, R. P., with Joyeux, 53 (Hel.)
Dombray, P., with Thiry, 757 (Hel.)
Donatien, A., with Parrot & Lestoquard, 504 (K.A.)
Doorenbos, W., 682 (Chl.)
Dorai, R., with Jolly & Fenn, 151 (Z.)
Dorling, R., with Eccles, 276 (Der.)
Dos Santos, R., 485 (Z.)
Dove, W. E., 760 (Hel.)
—— & Shelmire, B., 450, 778 (Fev.)
——, with ——, 157 (Z.)
Dowling, G. B., 326 (Myc.)
Drake, D. C. & Coulter, J. L. S., (771) (Hel.)
Drenowski, A. K., 709 (Mal.)
Du, S. D., 212 (R.F.)
Dublineau, J., with Richet, 645 (S.S.)
Dubois, A., 290, 297 (S.S.), 546 (Lep.), 563 (R.F.)
——, with Rodhain, 83, 428 (Hel.)
——, with Taramelli, 54 (Hel.)
Ducosté, M., (720) (Mal.)
Dufour, V., with Couvy & Lambert, 676 (Pl.)
Dugdale, J. N., 246 (B.R.)
Duguet, 680 (Chl.)
Duke, H. L., 175 (Lab.), 629 (S.S.)
Dunn, L. H., 770 (Hel.)
——, with Clark, 655 (S.S.)
——, with —— & Benavides, 208 (R.F.)
Duran, A., with Kraus, 596 (Rab.)
Durand, P., 790, 791 (Fev.)
—— & Laigret, J., 457, 791 *ter* (Fev.)
Durieux, C., 558 (R.F.)
——, with Mathis, 555 (R.F.)
——, with Pons, 678 (Pl.)
Dvolaitskaya-Barischewa, K. M., with Kritschewski, 208 (R.F.)
Dyer, R. E., Ceder, E. T., Lillie, R. D., Rumreich, A. & Badger, L. F., 446 (Fev.)
——, ——, Rumreich, A. & Badger, L. F., 16, 446 (Fev.)
——, with ——, —— & ——, 447 (Fev.)
——, ——, Workman, W. G., Rumreich, A. & Badger, L. F., 447 (Fev.)

Dyer, R. E., Rumreich, A. S. & Badger, L. F., 444 (Fev.)
——, Workman, W. G., —— & Rumreich, A., 777 (Fev.)
——, ——, Ceder, E. T., Badger, L. F. & Rumreich, A., 777 (Fev.)

E

Earle, W. C., 835 (Z.)
—— & Doering, C. R., 423 (Hel.)
Easmon, M. C. F., 263 (Lep.)
Eberson, F. & Mossman, W. G., 558 (R.F.)
Eccles, C. E. & Dorling, R., 276 (Der.)
Eckhardt, A., 526 (Misc.)
Edge, P. G., 232 (Misc.), 882 (B.R.)
Efremow, V., 4 (Sp.)
Egorow, A., with Lenskaja, Siwolobow, Larionowa, Marjina, Lebedewa, Barsukowa & Dikow, 375 (Pl.)
Eguchi, J., (587) (Am.)
Egyptian Government, (720) (Mal.)
Eichbaum, F., 550 (Lep.)
Eigenberger, F., 172 (Z.)
Eisma, M., 593 (B.R.)
Ejercito, A., (362) (Mal.)
Ejersito, A. & Laurel, A. G., 719 (Mal.)
Eldin, M. S., 698 (Mal.)
Eller, K., 716 (Mal.)
Elliot, A. H., with Nuzum & Priest, 125 (Z.)
Elliot, R. H., 439 *bis*, 856 (Oph.)
Elmes, B. G. T., with Smith, 235 (Misc.)
El-Tobgy, A. F. & Wilson, R. P., 437 (Oph.)
Emanuels, B. J., 241 (Misc.), 443 (Fev.)
Emmons, C. W., with Kesten, Ashford, Benham & Moss, 860 (Der.)
Engel, A., 5 (Sp.)
Engman, M. F., Jr. & Meleney, H. E., 254 (Am.)
Epstein, B., (493) (Z.)
Epstein, C. I., 68 (Hel.)
Erber, B., 567 (Lept.)
Erulkar, A. S., (625) (Pel.)
Escalar, G., with Pecori, (364), (721) (Mal.)
Escomel, E., 323 (Myc.), (863) (Der.)
Eskey, C. R., with Mostajo & Long, 370 (Pl.)
Esler, A. R., (278) (Der.)
Espié, A., 73, 425 (Hel.)
Essed, W. F. R., 829 (Z.)
Essex, H. E. & Magath, T. B., 413 (Hel.)
——, with Magath, 49, 413 (Hel.)
Estas, 686 (Mal.)
—— & Sambon, M., (244) (Misc.), (363 *bis*) (Mal.)
Estas, P., with ——, 537 (Misc.)
Etchevarne, C. & Negroni, P., 861 (Der.)
Etinger-Tulczynska, R., 301 (S.S.)
Eubanas, F., 267 (Lep.)
Eusterman, G. B. & O'Leary, P. A., 95 (Pel.)
Evans, A. M., (163), 477, 478, (493) (Z.)
Eyraud, E., with Velu & Petitdidier, 504 (K.A.)

F

Fabiani, G., with Pinoy, 851 (Lep.)
Fagge, C. H., 248 (B.R.)
Fairley, K. D., with Kellaway, 747 (Hel.)
Fairley, N. H., 410, 427 (Hel.), 466 (Sp.)
—— & Kilner, T. P., 463 (Sp.)
Fakhry, A., 530 (Misc.), 619 (Pel.)
Farinaud, with Lavau, Ragiot, Souchard & Lieou, 205 (Lept.)
Farinaud, E., with Toumanoff, (494) (Z.)
——, —— & Hoang-Thuy-Ba, (720) (Mal.)
Farinaud, M. E., 339 (Mal.)
Fauconnier, J., with Leger & Vassal, (244) (Misc.)
Faust, E. C., 70 *bis*, 763 (Hel.), 126, 163 (Z.) 229 (Misc.), 252, 257, 586 *bis* (Am.), 690 (Mal.)
Fawcus, H. B., 512 (Misc.)
Federated Malay States, 520 (Misc.)
Fehmi, N., 437 (Oph.)
Feilchenfeld, H., 730 (C.Bu.)
Feng, L., 76, 426 (Hel.), 137 (Z.)
Feng, L. C., with Hoeppli, 129 (Z.)
Fenn, V. W., with Jolly & Dorai, 151 (Z.)
Fernandez, J., with Niño & Palant, (278) (Der.)
Fernández, J. M. M., with Carrillo & Schujman, 264 (Lep.)
Ferradas, M. G. & Toscano, J. M., 118 (K.A.)
Ferrier, P., 271 (Lep.)
Feyte, R., 558 (R.F.)
de Feyter, C., 686, 703 (Mal.)
Fialho, A., 861 (Der.)
Fieschi, A., (432) (Hel.)
Findlay, G. M., 453 (Fev.), 725 (C.Bu.)
——, with Broom, 453 (Fev.)
—— & Daubney, R., 453 (Fev.)
—— & Hindle, E., 201 (Y.F.)
Fischer, A. W. & Schmidt-La Baume, 729 (C.Bu.)
Fischer, O., (363) (Mal.), 508 (Misc.)
——, with Mühlens, 706 (Mal.)
Fischl, F., (363) (Mal.)
Fischl, V. & Schlossberger, H., 733 (B.R.)
Fisher, L. C., 783 (Fev.)
Fisk, G. H., (363) (Mal.)
Fitzgerald, G. H. & Dey, N. C., 385, 722 (Y. & S.)
FitzGibbon, H. E., 316 (Misc.)
Fleming, W. D., with Holt & Kintner, 795 (Fev.)
Fletcher, L. R., 252 (Am.)
Foley, H., 227 (Misc.)
——, with Sergent, Edm., Sergent, Et., Parrot, Catanei & Senevet, 332 (Mal.)
Fonquernie, (375) *bis* (Pl.)
Fonquernie, J., (375), 674 *bis* (Pl.), 839 *ter* (Z.)
da Fonseca, F., with Monteiro & Prado, 448 (Fev.)
da Fonseca, O., 330 *bis* (Myc.)
—— & da Rosa, A. F., 324 (Myc.)
Foster, A. O. & Cort, W. W., 762 (Hel.)
—— & Daengsvang, S., 762 (Hel.)
Fourche, J. A. & Haveaux, G., 305 (S.S.)
Fox, C., 153 (Z.)
Fralic, H. B., 621 (Pel.)
Franchini, G. & Ganora, R., (363) (Mal.)
Francis, E., 675 (Pl.)
Franco, E. E. & Manai, A., 869 (K.A.)
Franklin, R. H., with Low, 501 (K.A.)
Frazier, C. N., with Hu, C., 724 (Y. & S.)
Freeborn, S. B., 833 (Z.)

Freeman, W., (363) (Mal.)
Frei, W., 731 (C.Bu.)
Freise, F. W., 271 (Lep.)
Freund, H. & Reiss, F., 390 (C.Bu.)
Fried, E., with Laigret, 558 (R.F.)
Friend, N. B., 798 (H.S.)
Frobisher, M. Jr., 199, 200, 577 (Y.F.)
——, Davis, N. C. & Shannon, R. C., 196 (Y.F.)
——, with Sawyer, (579) (Y.F.)
——, with Shannon, (164) (Z.)
—— & Shannon, R. C., 396 (Misc.)
Fróes, H. P., 70 (Hel.), 275, 861 (Der.)
Frolowa, W. T., with Platonow, 738 (Hel.)
Fronville, 518 (Misc.)
Fujisawa, Y., with Kimura & Misugi, 785 (Fev.)
Fulconis (375) (Pl.)
Fülleborn, F., 73, 83, 405, 425, 740, 751 (Hel.), (469) (B.R.), 476 (Z.)
Fuller, C. & Mossop, M. C., 145 (Z.)

G

Gabaldon, A., (163) (Z)
Gabriélidès, A., 856 (Oph).
Gaide, 159 (Z.)
—— & Marquand, 803 (Misc.)
Galanowa, N. W., with Lebedewa, 562 (R.F.)
Galea, M., 194 (Rab.)
Galletti, D., (363) (Mal.)
Galliard, H., 397 (Misc.), 429 (Hel.), 475, 477 (Z.)
Galli-Valerio, B. & Bornand, M., 47 (Hel.)
Ganguly, R., with Nandi, 62 (Hel.)
Ganora, R., with Franchini, (363) (Mal.)
Gaona, R. J., with Delamare, (554) *bis* (Lep.)
Garcia de Cosa, C., 812 (Misc.)
Gardiner, M. L., with Miller, 748 (Hel.)
Garin, C. N., Rousset, J. & Gonthier, B., 39, 756 (Hel.)
Garrod, L. P., with Stone, 327 (Myc.)
Gaschen, H., with Roubaud, 141, 828 (Z.)
Gater, B. A. R., 842 (Z.)
—— with Green, 337 (Mal.)
Gatti, C., with Delamare, 329 (Myc.), 506 (K.A.), 564, 565 (R. F.)
——, with —— & Bruyn, 525 (Misc.)
——, with —— & Gonzalez, 873 (K.A.)
Gaudin, O., with Anglade & Arcony, 408 (Hel.)
—— & Carron, B., 408 (Hel.)
Gay-Prieto, J., 731 (C.Bu.)
Gébel, G., 62 (Hel.)
Geneeskundig Tijdschrift voor Nederlandsch-Indië, 184 (Lab.), 523 (Misc.)
Genevray, J., with Mesnard, 684 (Chl.)
George, P.V., with King, Mankikar & Jesudasan, 151 (Z.)
Gérard, P., Moissonnier & Welti, 577 (Y.F.)
Germain, with Plazy, 792 (Fev.)
——, with —— & Marcandier, 115 (K.A.)
——, with ——, —— & Pirot, 21 (Fev.)
——, with —— & Plazy, M. 792 (Fev.)
Gharpurey, K. G., 169 *bis*, 853 (Z.)
Ghiron, M., 668 (Bl.)
Ghosal, J. N., (668) (Bl.)
Ghosh, B., 835 (Z.)
Ghosh, P. K., 432 (Hel.)
Gibson, P. L., 725 (C. Bu.)
Gilks, J. L. (388) (Y. & S.)
——, with Orr, 233 (Misc.)
Gill, C. W. H., 304 (S. S.)
Gillan, R. U., (388) (Y. & S.)
Gille, R., with Benhamou & Nouchy, 115 (K.A.)
Gingold, N., with Nicolau, (364) (Mal.)
Gingrich, W., 818 (Z.)
Girard, 375 (Pl.)
Girard, G. (375) (Pl.)
—— & Hérivaux, A., 371 (Pl.)
——, Robic, J. & Hérivaux, A., 839 (Z.)
Giraud, P., 872 (K. A.)
——, with Cassoute & Trabuc, 869 (K.A.)
Girges, R., 44 *bis*, 410, 740, 742 (Hel.)
Glusman, M. P., Gorfunkel, D. M. & Ssolowiewa, J. W., 195 (Rab.)
Gobert, E., 671 (Pl.)
Gohar, M. A., 269 (Lep.)
Goldberg, M. & Pijper, A., 275 (Der.)
Gold Coast, 178 (Lab.)
Gomes, J. M., 268 (Lep.)
Gonthier, B., with Garin & Rousset, 39, 756 (Hel.)
Gonzalez, D., with Delamare & Gatti, 873 (K.A.)
Goodale, R. H., with Brooke, (259) (An.)
Goodloe, S., with Taliaferro & Cannon, 126 (Z.)
Goodpasture, E. W., 576 (Y.F.)
——, with de Monbreun, 393, 395 (G.V.)
Gopsill, W. L., 41 (Hel.)
van Gorder, G. W., with Chen & Yuan, 253 (Am.)
Gordon, J., 191 (Rab.)
Gordon, R. M., 409 (Hel.)
—— & Davey, T. H., 695 (Mal.)
Gore, K. B., 771 (Hel.)
Gorfunkel, D. M., with Glusman & Ssolowiewa 195 (Rab.)
Gothoskar, S. B., 320 (Misc.)
Goto, T., 743 (Hel.)
Goutséwitch, A. W., with Potapenko, 55 (Hel.)
Gowans, F. J., 255 (Am.)
Goyanes, J., with Pittaluga, (433) (Hel.)
Grace, A. W. & Grace, F. B., 73 (Hel.)
Graham, J. D., 228 *bis* (Misc.), 373 *bis* (Pl.),
Grant, H. G., Newman, B. M. & Wood, P. D., 836 (Z.)
Grantham-Hill, C., 274 (Der.)
Grasset, E. & Zoutendyk, A., 171 (Z.), (538) (Misc.)
Grasso, R., 251 (Am.)
Graubner, F., 759 (Hel.)
Green, A. K., with Heydon, 32 (Hel.)
Green, R., 702, 707, 718 (Mal.)
—— & Gater, B. A. R., 337 (Mal.)
Green, R. T. B., 127 (Z.)
Greenwood, F. G., 395 (G. V.)
Grégoire, with Abrami & Wallich, 499 (K.A.)
Griffitts, T. H. & Griffitts, J. J., 825 (Z.)
Griffitts, T. H. D., with Mayne, 347 (Mal.)
Grikurow, W., with Bokalo, Wedischtschew, Sabinin & Jegorow, 679 (Pl.)
Groothoff, A., 713 (Mal.)
Gruber, G. B., 62 (Hel.)

Grubmann, M. S., 250 (Am.)
Gudger, E. W., 491 (Z.)
Guglielmi, F., with Raybaud, 372 (Pl.)
Guha, B. C., 96 (Pel.)
Guha, P., 870 (K.A.)
Guillain, G., Mollaret, P. & Lereboullet, J., (100) (Pel.)
Guillerm, J., with Boez & Marneffe, 267 (Lep.)
Guilliny, R., 37 (Hel.), 122 (Z.), 371 (Pl.)
Guillon, 47 (Hel.)
Gulati, A. N., (432) (Hel.)
Gulbransen, R., with Browning, Cohen & Ashley, 659 (S.S.)
——, with ——, —— & Cooper, 294, 645 (S.S.)
Gunn, H., 51 (Hel.)
—— & Howard, N. J., 255 (Am.)
Gupta, B. M. D., with Knowles, 701 (Mal.)
——, with —— & Basu, 592 (B.R.)
——, with Napier, 707 (Mal.)
Gupta, C. R. D., 109 (K.A.)
——, with Napier, 106 (K.A.)
——, with —— & Butcher, 709 (Mal.)
Gupta, P. C., with Mukherjee, 234 (Misc.)
Gupta, S. K., with Pasricha & de Monte, 315 *ter* (Misc.), 381, 684 *bis* (Chl.)
Guthrie, J. B., 623 (Pel.)
Gutiérrez V., L., 430 (Hel.)
Guyomarc'h, Toullec & Alain, 703 (Mal.)

H

Haagen, E. & Theiler, M., 577 (Y.F.)
de Haas, J. H., 438 (Oph.)
Hack, P., 39 (Hel.)
Hackett, L. W., Martini, E. & Missiroli, A., 832 (Z.)
——, with —— & ——, 480 (Z.)
—— & Missiroli, A., 692 (Mal.)
Haddad, E., 541 (Lep.)
Hakki, I., 121 (Z.)
Halawani, A., with Biggam & Ragab, 256 (Am.)
——, with Khalil & Hilmy, 769 (Hel.)
Hall, M. C., (843) (Z.)
Hamlyn-Harris, R., 14 (Fev.), 133 (Z.)
Handbuch der Haut- und Geschlechtskrankheiten, 469 (B.R.)
Hara, M., with Ohmori, Okamoto, Nakamura & Kurokawa, 615 (Bb.)
Hara, Y., 787 (Fev.), 852 (Z.)
Harasawa, J., with Watanabe & Ono, 851 (Lep.)
Hargrave, W. W., 14 (Fev.), 510 (Misc.)
Harley, G. W., 769 (Hel.)
Harris, F., 338 (Mal.)
Harston, M., 436 (Oph.)
Harvey, D. & Symes, C. B., 140 (Z.)
Hase, A., (494) (Z.)
Hasegawa, K., 304, 305 *ter* (S.S.)
Hashim, M., 42 (Hel.)
Hasle, 18 (Fev.)
Hassall, A., with Stiles, 162 (Z.)
Hassan, A., 43 (Hel.)
——, with Khalil, 411, 741, (722) (Hel.)
Hasselmann, C. M., (388) (Y. & S.), 531 *bis* (Misc.)
Hasselmann, C. M., with Schöbl, 723 (Y. & S.)
Hasskó, A., 296 (S.S.)
Hauer, A., 771 (Hel.)
Haveaux, G., with Fourche, 305 (S.S.)
Havens, L. C. & Mayfield, C. R., 601 (Rab.)
Hawking, F., with Yorke & Murgatroyd, 293 (S.S.)
Hawley, H., 805 (Misc.)
Hayashi, N., 786 (Fev.)
Hay-Michel, A., (538) (Misc.)
Hayne, T. B., with Beeuwkes, 196 (Y.F.)
Hazato, H., with Nagayo, M., Miyagawa, Mitamura, Tamiya, Sato & Imamura, 25 (Fev.)
——, with ——, Sato, Miyagawa, Mitamura & Tamiya, 784 (Fev.)
——, with ——, Tamiya & Mitamura, 18 (Fev.)
Hearne, K. G., 799 (H.S.)
Hecht, O., 133 (Z.)
Heckenroth, 658 (S.S.)
Héderer, 351 (Mal.)
Hedrich, W., 764 (Hel.)
Hegner, R., Johnson, C. M. & Stabler, R. M., 584 (Am.)
Heinemann, H., 526 (Misc.)
Hellerström, S., 391, 393, 728 (C.Bu.)
—— & Wassén, E., 727 *bis* (C.Bu.)
Helminthological Abstracts, 879 (B.R.)
Helmy, M. M., with Tomb, 410 (Hel.)
Henderson, J. M., 265 (Lep.)
——, with Napier, 114 (K.A.)
Henderson, L. H., 332 (Mal.)
Hennessey, R. S. F., 316 (Misc.)
——, with Owen, 431 (Hel.), 434, 438 (Oph.)
Henry, A., 63 (Hel.)
Henry, D. P., (843) (Z.)
Henry, T. A., 712 (Mal.)
Herbert, H., 438 (Oph.)
Hérivaux, A., with Girard, 371 (Pl.)
——, with —— & Robic, 839 (Z.)
—— & Rahoerson, R., 259 (Dys.)
Hermant, 223 (Misc.)
Hermitte, L. C. D., 480 (Z.)
Herms, W. B., 821 (Z.)
Hernando, E., 377 (Chl.)
Herrero Rubio, P., 499 (K.A.)
Hesse, E., 603 *bis* (Rab.)
Heydon, G. M., 475 (Z.)
—— & Green, A. K., 32 (Hel.)
Hickey, G. V., (259) (Am.)
Hickling, R. A., 71 (Hel.)
Hicks, C. S., Matters, R. F. & Mitchell, M. L., 518 (Misc.)
Hicks, E. P., 838 (Z.)
Higazi, I., (771), (772) (Hel.)
Higuchi, S., 204, (205) (Lept.)
Hilferty, M. M., with Shattuck, 798 (H. S.)
Hill, R. B. & Niño Astudillo, J., 821 (Z.)
Hiller, W., 760 (Hel.)
Hilmy, I. S., with Khalil & Halawani, 769 (Hel.)
Hindle, E., 108 (K. A.), 573, (579) *bis* (Y.F.)
——, with Findlay, 201 (Y.F.)
——, with Smith, 171 (Z.)
Hinman, E. H., 475, 824 *bis* (Z.)
——, with Matheson, 132 (Z.)
Hino, I., 47 (Hel.)
Hirano, H., 567 (Lept.)
Hiroki, H., (213) (R.F.)

Hirsch, K., (205) (Lept.)
Hirst, L. F., 366 (Pl.), 757 (Hel.)
Hirst, S., 157 (Z.)
Hissette, 83 (Hel.)
Hiyeda, K., (587) (Am.), (720) (Mal.)
Hizon, R. P., (618) (Bb.)
Hoang-Thuy-Ba, with Farinaud & Toumanoff (720) (Mal.)
Hoare, C. A., 148, 472, 815 (Z.)
Hobson, R. P., 485 (Z.)
Hodgkin, E. P., with Corbett, 528 (Misc.)
Hoeppli, R. & Feng, L. C., 129 (Z.)
—— & Hsü, H. F., 405 (Hel.)
——, with Khaw, (163) (Z.)
Hoffman, F. L., 690 (Mal.)
Hoffman, W. A., 72, (86) (Hel.),
——, Marin, R. A. & Burke, A. M. B., 768 (Hel.)
Hoffmann, C. C., 688 (Mal.)
Hoffmann, H., (469) (B.R.)
Hoffmann, J. M., 238 (Misc.)
—— & Schultsz, T. W., 503 (K.A.)
Hoffmann, W. H., 542, (554) (Lep.), 579, (579) (Y.F.)
Hogue, M. J. (588) (Am.)
Holland, J. H., 698 (Mal.)
Holt, R. L., 318 (Misc.)
——, Fleming, W. D. & Kintner, J. H., 795 (Fev.)
—— & Kintner, J. H., 13, 795 (Fev.), 827 (Z.)
—— & Russell, P. F., 341 (Mal.)
——, with St. John, 441 (Fev.)
——, with Simmons, St. John & Reynolds, 13 (Fev.)
van Hoof, L., 643 (S.S.)
d'Hooghe, 312 (Misc.)
van Hoorde, 308 (Misc.)
Hopkins, G. H. E., with Symes, 840 (Z.)
Hopkins, H. H., 537 (Misc.)
Hoshizaki, S., 781 (Fev.)
Hosono, S., with Nishibe & Miyazawa, 785, 786 (Fev.)
Houdemer, E., with Joyeux & Baer, 749 (Hel.)
Houssiau, F., (259) (Am.)
Howard, N. J., with Gunn, 255 (Am.)
Hsu, H. F., with Hoeppli, 405 (Hel.)
Hsu, I. T., (259) (Am.)
Hu, C. H., 297 (S.S.)
Hu, C. K., with Chen & Kurotchkin, 322 (Myc.)
—— & Frazier, C. N., 724 (Y. & S.)
Hu, S. M. K., (432) (Hel.)
Huart, A. J., (363) (Mal.)
Hubbard, R. S., with Baumgartner, 9, 10 (Sp.)
Hudson, E. H., (720) (Mal.)
—— & Young, A. L., 230 (Misc.)
Hudson, J. R., with Daubney, 453 (Fev.)
Hudson, N. P., 200, 576 (Y.F.)
Huff, C. G., 126 (Z.), 703 (Mal.)
Hughes, M., 524 (Misc.)
Hughes, T. A. & Shrivastava, D. L., 348 (Mal.)
Hughes, W. L., 434 (Oph.)
Huinink, A. M. S. B., with Schuurman, 152 (Z.)
Hulse, C. R., with O'Connor, 765 (Hel.)
Hurst, E. W., 605 (Rab.)
—— & Pawan, J. L., 187, 595 (Rab.)
Hussameddin, 420 (Hel.)

I

Icasiano, M. C. (432) (Hel.)
Ichihara, T., with Ohtawara, 552 (Lep.)
Iles, U. G., (100) (Pel.)
Imagawa, Y., with Kawamura, 28, 783, 787 (Fev.)
——, with —— & Shibata, 788 (Fev.)
Imamura, A., with Nagayo, Miyagawa, Mitamura, Tamiya, Sato & Hazato, 25 (Fev.)
Ince, H. T. (163) (Z.)
India, 228 (Misc.)
Innes, F. R., 237 (Misc.)
Ishii, N. & Tei Tok Wa, 35 (Hel.)
Ishii, Y. & Yamashiro, R., 752 (Hel.)
Ishioka, H., with Kamisawa, (720) (Mal.)
Ishiwara, K. K. & Ogata, N., 788 (Fev.)
Iswariah, V., with Chopra, 170 (Z.)
—— & David, J. C., 852 (Z.)
Iwase, Y., 853 (Z.)
Iyengar, M. O. T., 334, 343 (Mal.), 478 (Z.)
——, with Rao, 426 (Hel.)
—— & Sarathy, M. K. P., 823 (Z.)

J

Jack, J., 318 (Misc.)
Jack, R. W., 147 (Z.)
Jackson, C. H. N., 148 (Z.)
Jacob, A., with Jame & Jude, (851) (Lep.)
Jacques, F., 337 (Mal.)
Jahnel, F., 211 (R. F.)
Jamal-ud-Din, 856 (Oph.)
Jame, L., Jacob, A. & Jude, A., (851) (Lep.)
—— & Jude, A., 769 (Hel.)
James, C. S., 532 (Misc.)
James, S. P., 357 *bis* (Mal.)
——, Nicol, W. D. & Shute, P. G., 693 (Mal.)
Jamot, E., 633 (S.S.)
Janawoska, 437 (Oph.)
von Jancsó, N., 291, 292, 646, 647 (S.S.)
——, with Kroò, 240 (Misc.)
Jansen, B. C. P., Kinnersley, H. W., Peters, R. A. & Reader, V., 92 (Bb.)
Jantzen, W., 31 (Fev.), 81 (Hel.), 90 (Bb.)
Japanese Journal of Experimental Medicine, 270 (Lep.)
Jeaume, G., (507) (K.A.)
Jegorow, A., with Bokalo, Wedischtschew, Sabinin & Grikurow, 679 (Pl.)
Jemma, R., (363) (Mal.)
Jermoljewa, Z.W. & Bujanowskaja, I. S., 356 (Mal.)
Jesudasan, F., with King, George & Mankikar, 151 (Z.)
Jewell, N. P., 460 (Und.)
Jirovec, O., 126 (Z.)
Joannides, G., Papagheorghiou, S. & Angelo, A., 329 (Myc.)
Johnson, C. M., with Hegner & Stabler, 584 (Am.)
Jolly, with Toullec & Alain, (364) (Mal.)

Jolly, G. G., Fenn, V. W. & Dorai, R., 151 (Z.)
Jonckheere, A., 307 (Misc.)
Jones, S. B., 742 (Hel.)
Journal of the Public Health Association of Japan, (382) (Chl.)
Joyeux, C. & Baer, J. G., 405 (Hel.)
—— & Dollfus, R. P., 53 (Hel.)
——, Houdemer, E. & Baer, J. G., 749 (Hel.)
Jude, A., with Jame, 769 (Hel.)
——, with —— & Jacob, (851) (Lep.)
Junès, E., 436 (Oph.)

K

Kadlez, N. & Kubarev, M., 150 (Z.)
Kahn, B. L., 621 (Pel.)
Kaiser, L., (86) (Hel.), 360 (Mal.)
Kaiwa, J., 789 (Fev.)
Kaktin, A., 191 (Rab.)
Kaktine, A., 605 (Rab.)
Kalajew, A. W., 211 (R. F.)
Kamalow, N., 54 (Hel.)
Kamisawa, O. & Ishoka, H., (720) (Mal.)
Kandelaki, S., 361 (Mal.)
Kapussto, M. L., 295 (S.S.)
Kapusto, M. L., with Rubinstein, 210 (R.F.)
Kassirsky, I. J., with Burova, L. F., 670 (B.R.)
Kassirsky, J. & Burova, L., 619 (Pel.)
Kastein, J., 411 (Hel.)
Katsuta, I., 413, 746 (Hel.)
Kauntze, W. H., 174 (Lab.)
Kawamura, R. & Imagawa, Y., 28, 783, 787 (Fev.)
——, Shibata, T. & Imagawa, Y., 788 (Fev.)
Kawanishi, S., 762 (Hel.)
Kawashima, T., with Kuroi, Suzuki, Mai & Yokoyama, 587 (Dys.)
Kawatsuré, S., with Ota, 325 (Myc.)
Kecht, B., (320) (Misc.)
Keilman, W. I., 51 (Hel.)
Kellaway, C. H., 172, 852 (Z.)
—— & Fairley, K. D., 747 (Hel.)
—— & Morgan, F. G., 852 (Z.)
—— & Williams, F. E., 172, 853 (Z.)
Keller, A. E., 36, 417 (Hel.)
——, Casparis, H. & Leathers, W. S., (86) (Hel.)
——, Leathers, W. S. & Bishop, E. L., 737 (Hel.)
——, with Otto & Cort, 56 (Hel.)
Keller, P., 855 (Oph.)
Kelly, R., with Routledge, (625) (Pel.)
Kelser, R. A., 195 (Rab.)
Kemp, A. H., 40 (Hel.)
Kemp, H. A., 16, 779 (Fev.)
Kenya, Colony & Protectorate of: 174 (Lab.)
Kerby, T. R. F., 524 (Misc.)
Kermack, W. O. & McKendrick, A. G., 107 (K.A.)
Kerr, A. F. G., 313 (Misc.)
Kessel, J. F., with Crumrine, 534 (Misc.)
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Khalil & Hassan, A., 411, 741, (772) (Hel.)
——, Halawani, A. & Hilmy, I. S., 769 (Hel.)
Khartoum, 226 (Misc.)
Khaw, O. K., 108 (K. A.), 404, (432) (Hel.)
—— & Hoeppli, R., (163) (Z.)
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Kikuth, W., 705 (Mal.), 796 (Fev.)
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Kitamura, K., 68, (86), 761 (Hel.)
—— & Nakamura, M., (772) (Hel.)
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Kleinmann, H., 620 (Pel.)
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—— & Amagasaki, M., 844 (Lep.)
Koch, D. A., 124 (Z.)
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Koch, F., 551 (Lep.), 729 (C.Bu.)
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Kopstein, F., 487 *bis*, 493, 841, 853 (Z.)
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Kostyleff, N. N. & Blohina, Z. A., 33 (Hel.)
Kouri, P. & Arenas, R., 744, 745 (Hel.)
Kouwenaar, W., 523 (Misc.)
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Kowalzig, H., 242 (Misc.)
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Kurauchi, K., with Ando & Nishimura, 369 (Pl.)
Kurisu, S., 752 (Hel.)
Kuroi, C., Suzuki, T., Mai, H., Yokoyama, Z. & Kawashima, T., 587 (Dys.)
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——, with —— & Hu, 322 (Myc.)
—— & Ch'in, T. L., 321 (Myc.)
——, with Lim & Wu, 328 (Myc.)
——, with Reimann, 327, 328 (Myc.)
Kurup, P. K., (163) (Z.), 329 (Myc.)
Kuscheleff, W., 33 (Hel.)
Kuwabara, N., with Chiba, 124 (Z.)
——, with Tanabe, (494) (Z.)
——, with —— & Chiba, 124 (Z.)
Kyriazides, K., with Petzatakis, (568) (Lept.)

L

Labbé, M., Boulin, Besançon, J. & Petresco, 328 (Myc.)
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Lancet, 749 (Hel.)
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Lassalle, C. F., 187 (Rab.)
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—— & Stumpf, R., (205) (Lept.)
Lazzaro, G., 667 (Bl.)
League of Nations, 461 (Mal.)
League of Nations Monthly Epidemiological Report, 365 (Pl.), 376 (Chl.)
Leake, C. D., 580 (Am.)
——, with David, Anderson & Koch, 473 (Z.)
——, with Reed, Anderson & David 583 (Am.)
Leathers, W. S., with Keller & Bishop, 737 (Hel.)
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Lebedewa, E., with Lenskaja, Egorow, Siwolobow, Larionowa, Marjina, Barsukowa & Dikow, 375 (Pl.)

Lebedewa, M. N. & Galanowa, N. W., 562 (R.F.)
Le Bourdellès, B. & Velluz, L., 356 (Mal.)
Leclef, 664 (Bl.)
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Ledentu, G., 300 (S.S.)
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Leeson, H. S., 138 *bis*, 488, 839 (Z.)
Lefèvre, (86) (Hel.)
Lefranc, with Montpellier & Catanei, 329 (Myc.), 861 (Der.)
Lefrou, G., 225 (Misc.), 277 (Der.), (259) (Am.), 671, 673 (Pl.)
Le Gac, 206 (R.F.)
Legendre, J., 133 (Z.)
Leger, J. P., (721) (Mal.)
Leger, M., 281 (S.S.), 553, 848 (Lep.), 566 (Lept.) (721) (Mal.)
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Lemierre, A. & Lévesque, J., (588) (Am.)
Lenskaja, G. N., Egorow, A., Siwolobow, W., Larionowa, S., Marjina, J., Lebedewa, E., Barsukowa, O. & Dikow, A., 375 (Pl.)
Lentze, F. A., 194 (Rab.)
de Leon, W., with Oliver & de Roda, 550 (Lep.)
Leonard, C. S., with Reiner, 646 (S.S.)
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Le-van-Xuyen, with Tirouvanziam, (364) (Mal.), 855 (Oph.)
Levenson, E. D., 711 (Mal.), 833 (Z.)
Lévesque, J., with Lemierre, (588) (Am.)
Levin, I. M., with Pilot, 50 (Hel.)
Libert, C. E. M. J., 412 (Hel.)
Lickint, F., 820 (Z.)
Liddo, S., 819 (Z.)
Lie, H. P., 264 (Lep.)
Lieou, with Lavau, Ragiot, Souchard & Farinaud, 205 (Lept.)
——, with Souchard & Marneffe, 451 (Fev.)
Lieurade, 536 (Misc.)
Lièvre, J. A., with Brulé & Tsatsaronis, (568) (Lept.)
Liggett, H., 155 (Z.)
Lillie, R. D., 445 (Fev.)
——, with Dyer, Ceder, Rumreich & Badger, 446 (Fev.)
Lim, C. E., Kurotchkin, T. J. & Wu, C. J., 328 (Myc.)
Lindberg, 458 (Fev.)
Lindberg, K., 19 (Fev.)
Linton, R. W. & Poindexter, H. A., 298 (S.S.)
Liotard, M., with Oelsnitz, 498 (K.A.)
Lipschitz, L. A., 544 (Lep.)
Lisfranc, J., with de Brauwere, 653 (S.S.)
Little, C. J. H., 127 (Z.)
Little, J. L., (259) (Am.)
Livierato, S., Vagliano, M. & Constantakato, G., 716 (Mal.)
Lloyd, W., 399 (B.R.)
——, with Sawyer, 198 (Y.F.)
——, with —— & Kitchem, 572 (Y.F.)
Lodato, G., (772) (Hel.)
Lodder, J., 844 (Lep.)
Loeper, Soulié & Tonnet, 52 (Hel.)
van Loghem, J. J., 681 *bis* (Chl.)
Löhe, H. & Rosenfeld, H., 730 (C.Bu.)
Loi, L., (363) (Mal.)
Lombart, H., 350 (Mal.)
——, with Walravens, 38 (Hel.)
Long, J. D., 370 (Pl.)
——, with Mostajo & Eskey, 370 (Pl.)
Longhin, S., with Cantacuzène, 550 (Lep.)
Longo, D., (772) (Hel.)
Lopez-Neyra, C. R., 53 (Hel.)
Lopez Rizal, L., with Lull, 517 (Misc.)
——, Sian, J. & Punsalang, J. V., 680 (Chl.)
Lotze, H., (163) (Z.), 715 (Mal.)
Lourie, E. M., with Blacklock, 110 (K.A.)
Louveaux, L., (669) (Bl.)
Low, G. C., 75 (Hel.)
—— & Franklin, R. H., 501 (K.A.)
Lowe, J., 94 (Pel.), 539 (Lep.)
—— & Christian, E. B., 545 (Lep.)
Lücke, R., 326 (Myc.)
Ludlow, A. I., with Choy, 47 (Hel.)
Lull, G. F., 517 (Misc.), 540 (Lep.)
—— & Lopez Rizal, L., 517 (Misc.)
Lutrario, A., 25 (Fev.), (363) (Mal.)
Lynch, K. M., 819 (Z.)

M

MacArthur, W. P., 72 (Hel.)
Macauley, T. S., 232 (Misc.)
McCarrison, R., 396 (Misc.)
McClendon, S. J., 125 (Z.)
McCoy, O. R., 65, 67, 70 (Hel.)
——, with Miller, Jr. & Bradford, 764 (Hel.)
McCrea, A., 325 (Myc.)
Macdonald, G., 335, (363) (Mal.)
—— & Majid, A., 333 (Mal.)
Macdonald, I., (259) (Am.)
McDowall, R. J. S., 400 (B.R.)
Macfadyen, J. A., (588) (Am.)
McGillivray, W. S., 443 (Fev.)
McGuire, C., with Acton, 273 (Der.)
MacHattie, C. & Chadwick, C. R., 744 (Hel.)
—— & Mills, E. A., with Chadwick, C.R. 117 (K.A.)
——, with —— & Chadwick, 505 (K.A.)
Mackehenie, D., (31) (Fev.)
McKendrick, A. G., with Kermack, 107 (K.A.)
Mackie, F. P., with Naidu, 373 (Pl.)
McKie, M., with Burnet & Wood, 586 (Dys.)
McKinley, E. B., 74 (Hel.)
—— & Soule, M. H., 549 (Lep.)
——, with ——, 549 (Lep.)
Mackinnon, J. E., with Talice, 322, 323 (Myc.)
McKneely, T. B., (588) (Am.)
McLean, N., 279, 284 (S.S.)
McNeil, E., with Kofoid, 473 (Z.)
——, with —— & Kopac, 473 (Z.)
Madras, 858 (Oph.)
Madras Presidency, 685 (Chl.)
de Magalhães, O., 160 (Z.)
Magath, T. B. & Essex, H. E., 49 (Hel.)
——, with ——, 413 (Hel.)
Maggiora-Vergano, R., (363) (Mal.)
Magrou, J., Magrou, M. & Roubaud, E., 134 (Z.)
Mai, H., with Kuroi, Suzuki, Yokoyama & Kawashima, 587 (Dys.)
Maitra, G. C. & Ahuja, M. L., 170 (Z.), 380, 381 (Chl.)
—— & Mallick, S. M. K., 381 (Chl.)
Majid, A., with Macdonald, 333 (Mal.)
Majumder, A. R., (259) (Am.)
Makar, N., 410 (Hel.)
Malcomson, G. E. & Murthy, K. N., 3 (Sp.)
Maldonado, A., (797) (Fev.)
Mallick, S. M. K. & Maitra, G. C., (854) (Z.)
——, with ——, 381 (Chl.)
Mamou, H., with Laederich, Levaditi & Beauchesne, 730 (C.Bu.)
Manai, A., with Franco, 869 (K.A.)
Manalang, C., 340 (Mal.), 476 (Z.), 545 *bis* (Lep.)
Manca, S., 712 (Mal.)
Mandoul, A. H., 38 (Hel.)
Mandry, O. C., 45 (Hel.)
Mankikar, D. S., with King, George & Jesudasan, 151 (Z.)
Manon, 852 (Z.)
Manouélian, with Remlinger & Bailly, 605 (Rab.)
Manoussakis, E., 312 (Misc.), 662 (Bl.)
Manson-Bahr, P., 581, 582 (Am.), 639 (S.S.), 710 (Mal.), 860 (Der.)
Manwell, R. D., 710 (Mal.)
Maplestone, P. A., 759 (Hel.)
—— & Mukerji, A. K., 414, 417 (Hel.)
Marble, A. & Bauer, W., 6 (Sp.)
Marcandier & Pirot, R., 450, 777 (Fev.), 487 (Z.)
——, with Plazy & Germain, 115 (K.A.)
——, with ——, —— & Pirot, 21 (Fev.)
——, ——, Le Chuiton & Pirot, R., 20 (Fev.)
Marchoux, E., 348 (Mal.)
—— & Chorine, V., 559 (R.F.), 817 (Z.)
Mariani, M., 270 (Lep.)
Marie, A., with Levaditi & Lépine, 210 (R.F.), 391 (C.Bu.)
Marie, A. C. & Urbain, A., 195 (Rab.)
Marin, R. A., (259) (Am.)
——, with Hoffman & Burke, 768 (Hel.)
Marjina, J., with Lenskaja, Egorow, Siwolobow, Larionowa, Lebedewa, Barsukowa & Dikow, 375 (Pl.)
Markianos, J., (554) (Lep.)
——, with Lépine & Papayoannou, 850 (Lep.)
Marmo, A., 308, 310 (Misc.), 455 (Fev.), 507 (K.A.)
Marneffe, H., with Bablet, 598 (Rab.)
——, with Boez & Guillerm, 267 (Lep.)
——, with Souchard & Lieou, 451 (Fev.)
Marquand, with Gaide, 803 (Misc.)
Marque, (375) (Pl.)
de Marqueissac, H., 636, 640, 654 (S.S.)
Marquézy, R. A., Monnier & Borrien, H., 499 (K.A.)
Marseille-Médical, 459 (Und.)
Marshall, A., with Archibald, 44, 741 (Hel.)
Marshall, J. F., 130 (Z.)
Martin, G., 281 (S.S.)
Martin, J. T., (100) (Pel.)
Martin, R. & Monier, H. M., 284 (S.S.)
Martin-Charpenel, G. with Mathis & Kolochine, 575 (Y.F.)
Martini, E., 345, 349, 361 (Mal.). 469 (B.R.), (494) (Z.)
——, with Hackett & Missiroli, 832 (Z.)
——, Missiroli, A. & Hackett, L. W., 480 (Z.)
Martodiwirio, R. S. & Thierfelder, M. U., 587 (Dys.)
Marwits, E. L. & van Steenis, P. B., 254 (Am.)
Marzinowsky, E. J., 644 (S.S.)
Mascall, A. J., 516 (Misc.)
Más de Ayala, I., 206 (R.F.)
Mason, E. D. & Benedict, F. G., 234 (Misc.)
Mason, M., 246 (B.R.)
Massie, E., with Miller, 415 (Hel.)
Masson, P., with de Lavergne & Stumpf, (205) (Lept.)
Matheson, R., 156 (Z.)
—— & Hinman, E. H., 132 (Z.)
Mathew, K. C., 333 (Mal.)
Mathis, C., 206 (R.F.)
—— & Durieux, C., 555 (R.F.)
——, with Nicolau & Constantinesco, 597 (Rab.)
Mathis, M., Martin-Charpenel, G. & Kolochine, G., 575 (Y.F.)
Matono, A., (86), 426 (Hel.)
Matras, A., 272 (Der.)
Mattei, R. M., 44 (Hel.)

Matters, R. F., with Hicks & Mitchell, 518 (Misc.)
Mattlet, G., (538) (Misc.), 736 (Hel.)
Mauritius, 180 (Lab.)
Maxcy, K. F., with Pinkerton, 17 (Fev.)
Mayer, M., (469) (B.R.), 474 (Z.)
—— & Nauck, E. G., 811 (Misc.)
Mayfield, C. R., with Havens, 601 (Rab.)
Mayne, B., 689 (Mal.)
—— & Griffitts, T. H. D., 347 (Mal.)
Mazza, S., 306, 658 (S.S.)
—— & Arias Aranda, C., 117 *bis*, (120) (K.A.)
—— & Canal Feijóo, E. J., (278) (Der.)
—— & De los Rios, M., 119 (K.A.), (330) (Myc.)
——, Niño, F. L., Quintana, H. & Bernasconi, V., (330) (Myc.)
—— & Pasquini Lopez, C., (278) (Der.)
—— & Quintana, H. & De los Rios, M., (278) (Der.)
Medulla, C., 193 (Rab.)
Meidinger, F. E., 41 (Hel.)
de Meillon, B., 139, 144, 477 (Z.)
——, with Schüffner, Swellengrebel & Annecke, 693 (Mal.)
——, with Swellengrebel & Annecke, (364) (Mal.)
Meira, J. A., 841 (Z.)
Meleney, H. E., with Engman, Jr., 254 (Am.)
——, with Milam, 249 (Am.)
Mellanby, K., 823 (Z.)
de Mello, F., (244) (Misc.), 255 (Am.)
—— & Brás de Sá, 359 (Mal.)
——, with Vernencar, R. S. P., (721) (Mal.)
Menk, W., with Schlossberger, 812 (Misc.), 854 (Z.)
Menon, T. B., 398 (B.R.)
Mer, G., 144 (Z.)
——, with Kligler, 344, 360 (Mal.)
Mesnard with Roton, 116 (K.A.)
Mesnard, J., 338 (Mal.)
—— & Bordes, L. A., (363) (Mal.)
—— & Genevray, J., 684 (Chl.)
——, with Morin, (364) (Mal.)
Mesnil, F., 306 (S.S.)
Messik, K. E., 113 (K.A.)
Mexico, Instituto de Biologia de la Universidad Nacional, (86) (Hel.)
Meyer, A., 621 (Pel.)
Meyer, K., 390 (C.Bu.)
—— & Anders, H. E., 729 (C.Bu.)
Meyer, K. F., 188 (Rab.)
Meyerhof, M., 434 (Oph.)
Mhaskar, K. S. & Caius, J. F., 162 (Z.)
Michail, D., with Baroni, 435 (Oph.)
—— & Vancea, P., 435 (Oph.)
Mickaniewski, 666 (Bl.)
Milam, D. F. & Meleney, H. E., 249 (Am.)
Milani, C. & Cuboni, E., 354 (Mal.)
Milella, A., (494) (Z.)
Miller, H. M., Jr., 53, 415 *bis*, 748 *bis* (Hel.)
—— & Gardiner, M. L., 748 (Hel.)
—— & Massie, E., 415 (Hel.)
Miller, J. J., Jr., McCoy, O. R. & Bradford, W. L., 764 (Hel.)
Millous, Raboisson & Pluchon, 573 (Y.F.)
Mills, E. A. & Machattie, C. with Chadwick, C. R., 505 (K.A.)
——, with —— & ——, 117 (K.A.)
Mills, E. S., 50 (Hel.)
Milne, J., 463 (Sp.)
Missiroli, A., 691 (Mal.)
——, with Hackett, 692 (Mal.)
——, with —— & Martini, 832 (Z.)
——, with Martini & Hackett, 480 (Z.)
Misugi, Y., with Kimura & Fujisawa, 785 (Fev.)
Mitamura, T., with Nagayo, Miyagawa, Tamiya, Sato, Hazato, & Imamura, 25 (Fev.)
——, with ——, Sato, Miyagawa, Tamiya & Hazato, 784 (Fev.)
——, with ——, Tamiya & Hazato, 18 (Fev.)
——, with ——, —— & Sato, 25 (Fev.)
Mitchell, M. L., with Hicks & Matters, 518 (Misc.)
Mitra, P. N., 545 (Lep.)
Mitra, S., 309 (Misc.)
Miyagawa, Y., with Nagayo, Mitamura, Tamiya, Sato, Hazato & Imamura, 25 (Fev.)
——, with ——, —— & Sato, 25 (Fev.)
——, with ——, Sato, Mitamura, Tamiya & Hazato, 784 (Fev.)
——, & Okada, R., 67 (Hel.)
Miyao, I., 724 (Y. & S.)
Miyazawa, M., with Nishibe & Hosono, 785, 786 (Fev.)
Moffat, H. A., (538) (Misc.)
Moftah, S. G. & Nabih, M. S., 604 (Rab.)
Mohammed, A. S., 85, 411, 430 (Hel.)
Moissonnier, with Gérard & Welti, 577 (Y.F.)
Moldawskaya-Kritschewskaya, W. D., with Tsechnowitzer, 717 (Mal.)
Mollaret, P., with Guillain & Lereboullet, (100) (Pel.)
Mollison, W. M., 248 (B.R.)
de Monbreun, W. A. & Goodpasture, E. W., 393, 395 (G.V.)
Monge, C., 464 *bis* (Sp.)
—— & Weiss, P., (31) (Fev.)
Monier, H. M., (721) (Mal.), 844 (Lep.)
——, with Martin (284 (S.S.)
Monnier, with Marquézy & Borrien, 499 (K.A.)
Monserrat, C., 387 (Y. & S.)
Montañés, P., (851) (Lep.)
de Monte, A. J., with Pasricha & Gupta, 315 *ter* (Misc.), 381, 684 *bis* (Chl.)
Monteiro, J. L., 17 *bis*, 447, 778, (795) (Fev.)
——, da Fonseca, F. & Prado, A., 448 (Fev.)
Montel, M. L. R., 848 (Lep.)
Montgomerie, R. F., 413 (Hel.)
Montpellier, J., Catanei, A. & Lefranc, 329 (Myc.), 861 (Der.)
Mooij, W., 688 (Mal.)
Morales, R., 275 (Der.)
Morales-Otero, P., 269 (Lep.)
Morax, V., 436 (Oph.)
Morenas, L., 747 (Hel.)
Moreno Perez, I., 532 (Misc.)
Morgan, D. O., 59, (86) (Hel.)
Morgan, F. G., with Kellaway, 852 (Z.)
Morgan, M. T., (382) (Chl.)
Morin, H. G. S., (363), (721) (Mal.)
Morin, H., 338, 339 (Mal.)
—— & Mesnard, J., (364) (Mal.)
Morishita, K., (364) (Mal.), 479 (Z.)

Morishita, K., with Koidzumi, 828 (Z.)
Morison, J., 519 (Misc.)
Morquio, L., 416 (Hel.)
Morrell, C. A., with Wakeman, 200 (Y.F.)
Morris, E. S., 443 (Fev.)
Morris, H. H., 497 (K.A.)
Morris, K. R. S., 628 (S.S.)
——, with Saunders, 627 (S.S.)
Morris, K. S., with Saunders, (659) (S.S.)
Morrison, 741 (Hel.)
Morrow, H., (554) (Lep.)
Morton, C. B. & Archer, V. W., 417 (Hel.)
Moss, M. C., with Kesten, Ashford, Benham & Emmons, 860 (Der.)
Mossman, W. G., with Eberson, 558 (R.F.)
Mossop, M. C., with Fuller, 145 (Z.)
Mostajo, B., Long, J. D. & Eskey, C. R., 370 (Pl.)
Motais, F., (433) (Hel.)
Motta, J., 545 (Lep.)
Mottat, J., (554) (Lep.)
Mottoulle, L., 216 (Misc.)
Moufel, P., 720 (Mal.)
Moya, J. C., with Thonnard-Neumann & Brewster, 324 (Myc.)
Mühlens, P., 706 (Mal.), 771 (Hel.)
—— & Fischer, O., 706 (Mal.)
Muir, E., 262, 548 (Lep.)
—— & Chatterji, S. N., 847 (Lep.)
Muir, J. B. G., 752 (Hel.)
Mukerji, A. K., with Maplestone, 414, 417 (Hel.)
Mukerji, D. M., 782 (Fev.)
Mukerji, S., 130 (Z.)
Mukherjee, H. N. & Gupta, P. C., 234 (Misc.)
Mukherji, B., with Chopra, 529, 530 (Misc.)
Mulder, J., Bonne, C. & Sardjito, M., 204 (Lept.)
Müller, G., (433) (Hel.)
Müller, H., with Bonne, Kouwenaar & Vos, J. J. T., 242 (Misc.)
Mumford, R. H., 230 (Misc.)
Muraz, G., 658 (S.S.)
—— & Vaisseau, G., 642 (S.S.)
Muraz, M., 287 (S.S.)
Murdoch, F. F. & Smart, T. L., 151 (Z.)
Murgatroyd, F., with Yorke, 350 (Mal.)
——, with —— & Hawking, 293 (S.S.)
de Muro, P., (260) (Am.)
——, with Thomson, 652 (S.S.)
Murray, F. J. & Koh, P. K., (588) (Am.)
Murray, G. A., 441 (Fev.)
Murthi, K. N., 7 (Sp.)
——, with Pillai, 8 (Sp.)
Murthy, K. N., with Malcomson, 3 (Sp.)
Musgrave, W. E., (260) (Am.)

N

Nabih, M. S., with Moftah, 604 (Rab.)
Nadessin, with Aubin, 81 (Hel.)
——, with Soulage, 847 (Lep.)
Nagayo, M., Miyagawa, Y., Mitamura, T., Tamiya, T., Sato, K., Hazato, H. & Imamura, A., 25 (Fev.)
——, Sato, K., Miyagawa, Y., Mitamura, T., Tamiya, T. & Hazato, H., 784 (Fev.)
——, Tamiya, T., Mitamira, T. & Hazato, H., 18 (Fev.)
Nagayo, M., Tamiya, T., Mitamira, T. & Sato, K., 25 (Fev.)
Nagoya, T., (433) (Hel.)
Naidu, B. P. B. & Avari, C. R., 675 (Pl.)
—— & Mackie, F. P., 373 (Pl.)
—— & Sathe, R. G., 675 *bis* (Pl.)
Nainggolan, F. J., (843) (Z.)
Najera, L., 631 (S.S.), (772) (Hel.)
Nakajima, K., (433) *bis*, (772) (Hel.)
Nakamura, M., with Kitamura, (772) (Hel.)
Nakamura, S., with Ohmori, Okamoto, Hara & Kurokawa, 615 (Bb.)
Nakatomi, I., 258 (Dys.)
Nandi, P. & Ganguly, R., 62 (Hel.)
Napier, L. E., 144 (Z.), 500 (K.A.)
——, with Boyd & Roy, 312 (Misc.)
——, Butcher, D. & Gupta, C. R. D., 709 (Mal.)
—— & Campbell, H. G. M., 700 (Mal.)
—— & Gupta, B. M. D., 707 (Mal.)
——, with Gupta, C. R. D., 106 (K.A.)
—— & Henderson, J. M., 114 (K.A.)
—— & Krishnan, K. V., 495 (K.A.)
——, —— & Lal, J. C., 719 (Mal.)
——, with —— & ——, 870 (K.A.)
Nash, T. A. M., 147 (Z.)
National Medical Journal of China, 248 (B.R.)
Nattan-Larrier, L., 108 (K.A.), 298 (S.S.)
—— & Noyer, B., 301, 303, 651 (S.S.)
——, —— & Bediér, E., 651 (S.S.)
Nauck, E. G., 276 (Der.), (469) (B.R.)
——, with Mayer, 811 (Misc.)
——, with Schapiro, 419 (Hel.)
Naudi, J., (86) (Hel.)
Nayar, K. & Pillai, A. K., 857 (Oph.)
Nazmi, M., 33 (Hel.)
Negrie, with Le Chuiton, 101 (Und.)
Negroni, P., 322 *ter* (Myc.)
——, with Etchevarne, 861 (Der.)
Nepveux, F., with Labbé & Nichita, 121 (Z.)
Neri, F., (364) (Mal.)
Netter, A., 20, 773 (Fev.)
Neuland-Dobrowa, M., 35 (Hel.)
Neumann, H., 648 (S.S.)
——, with Schilling, 649 (S.S.)
New Guinea, Territory of, 802 (Misc.)
Newman, B. M., with Grant & Wood, 836 (Z.)
Newman, C., 88 (B.R.)
Newman, S. P., with Dawson, 352 (Mal.)
Nguyen-van-Khai, 610 (Bb.), 685 (Chl.)
Nguyen-van-Lieng, with Bordes, (362) (Mal.)
Nichita, with Labbé & Nepveux, 121 (Z.)
Nicol, W. D., with James & Shute, 693 (Mal.)
Nicolau, C. T., 389, 728 *quat.* (C.Bu.)
—— & Gingold, N., (364) (Mal.)
Nicolau, M. S. & Kopciowska, L., 600 (Rab.)
Nicolau, S., Cruveilhier, L. & Kopciowska, L., 601 *bis* (Rab.)
——, Mathis, C. & Constantinesco, V., 597 (Rab.)
Nicolle, C., 444, 790 (Fev.), 533 (Misc.)
—— & Anderson, C., 556 *bis* (565), (R.F.)
——, —— & Laigret, J., 557 (R.F.)
—— & Balozet, L., 598 (Rab.)
—— & Laigret, J., 774 (Fev.)
Nicolle, P., with Launoy & Prieur, 644 (S.S.)
Nielsen, F. O., with Aars, 387 (Y. & S.)
Nieschulz, O., (163) (Z.)

Nieschulz, O. & Bos, A., (163) (Z.)
Nieuwenhuis, A. W., 362 (Mal.)
Niño Astudillo, J., with Hill, 821 (Z.)
Niño, F. L., (278) (Der.), (330) *bis* (Myc.)
——, Fernandez, J. & Palant, M., (278) (Der.)
——, with Mazza, Quintana & Bernasconi, (330) (Myc.)
Nishibe, M., Hosono, S. & Miyazawa, M., 786 (Fev.)
——, Miyazawa, M. & Hosono, S., 785 (Fev.)
Nishimura, F., 73 (Hel.)
Nishimura, H., with Ando & Kurauchi, 369 (Pl.)
van Nitsen, R., 216 (Misc.), 703 (Mal.)
Nitzulescu, G. & Nitzulescu, V., (164) (Z.)
Nitzulescu, V., 145, (164) (Z.)
Nocht, B., (244) (Misc.)
Nolasco, J. O., 849 (Lep.)
Nolf, L. O., 750 (Hel.)
Nomura, S. & Akashi, K., 442 (Fev.)
Normet, L., 376 (Chl.)
Noronha, A. J., 84, 432 (Hel.)
North, E. A., with Cilento, 551 (Lep.)
Nouchy, A., with Benhamou & Gille, 115 (K.A.)
Nowak, H., 60 (Hel.)
Noyer, B., with Nattan-Larrier, 301, 303, 651 (S.S.)
——, with —— & Bédier, 651 (S.S.)
Nuzum, F. R., Elliot, A. H. & Priest, B. V., 125 (Z.)

O

Obitz, K., (494) (Z.)
Ochoterena, I., 85 (Hel.)
——, with Uruena, 860 (Der.)
O'Connor, F. W., 252 (Am.), (397) (Misc.), 427, 766 (Hel.)
—— & Hulse, C. R., 765 (Hel.)
Oelsnitz & Liotard, M., 498 (K.A.)
d'Oelsnitz, M., 874 (K.A.)
Office International d'Hygiène Publique, 232 (Misc.)
Ogata, N., 27 (Fev.)
——, with Ishiwara, 788 (Fev.)
Ohmori, K., Okamoto, H., Hara, M., Nakamura, S. & Kurokawa, K., 615 (Bb.)
Ohtawara, T. & Ichihara, T., 552 (Lep.)
Okada, R., 65 (Hel.)
——, with Miyagawa, 67 (Hel.)
Okamoto, H., with Ohmori, Hara, Nakamura & Kurokawa, 615 (Bb.)
Oldham, J. N., 54 (Hel.)
O'Leary, P. A., with Eusterman, 95 (Pel.)
Olinger, M. T., with Barber, 331 (Mal.)
Oliveiro, C. J., with Rosedale, (618) (Bb.)
Oliver, W. W., de Leon, W. & de Roda, A. P., 550 (Lep.)
Olmer, D., (260) (Am.)
——, Botreau-Roussel, P. & Blanchard, M., (260) (Am.)
—— & Olmer, J., 456 (Fev.)
Olmer, J., 115 (K.A.)
Ono, I., with Watanabe & Harasawa, 851 (Lep.)
Orenstein, A. J., 241 (Misc.)
Ornstein, I., with Ballif, 622 (Pel.)
Orr, J. B. & Gilks, J. L., 233 (Misc.)
Ortiz de Landazuri, E., 821 (Z.)
Osterberg, A. E., with Brown, 256 (Am.)
Ota, M., 324 (Myc.)
—— & Kawatsuré, S., 325 (Myc.)
—— & Sato, S., 268, 551 (Lep.)
Ott, 660 (Bl.)
Otten, L., 372, 673 (Pl.)
Otto, G. F., 749, 751 (Hel.)
—— & Cort, W. W., 64 (Hel.)
——, —— & Keller, A. E., 56 (Hel.)
Otto, R., 173 (Z.)
Ouchakov, V., 603 (Rab.)
Owen, H. B. & Hennessey, R. S. F., 431 (Hel.), 434, 438 (Oph.)
Oyarzun, R., with Sievers, 745 (Hel.)

P

Pagonis, A., with Lépine & Caminopetros, 566 (Lept.)
Pai, M. N., 19 (Fev.)
Palant, M., with Niño & Fernandez, (278) (Der.)
Palau, with Perepérez, 738 (Hel.)
Palawandow, H. & Serebrennaja, A. I., 191 *bis* (Rab.)
Paldrock, A., 548 (Lep.)
Palmowitch, S., with Remlinger & Bailly, 189, 190, 192 *bis* (Rab.)
Palthe, P. M. v. W., 814 (Misc.)
Pampana, E., with Alessandrini & Sabatucci, 398 (B.R.)
Pampana, E. J., with Puntoni, 860 (Der.)
Panayotatou, A., 212 (R.F.), 382 *bis* (Chl.), (625) (Pel.)
Pandit, C. G., with King, 486 (Z.)
—— & Rao, R. S., 683 *bis* (Chl.)
Pangalos, G., with Lepine & Caminopetros, 775 (Fev.)
Papagheorghiou, S., with Joannides & Angelo, 329 (Myc.)
Papayoannou, A., with Lépine & Markianos, 850 (Lep.)
Pardo-Castello, V., 862 (Der.)
Paris Eguflaz, H., 629 (S.S.)
Parrot, L., 481 (Z.)
——, Donatien, A. & Lestoquard, F., 504 (K.A.)
——, with Sergent, Edm., Sergent, Et., Foley, Catanei & Senevet, 332 (Mal.)
Pascal, J. M., (120) (K.A.)
Pasquini Lopez, C., with Mazza, (278) (Der.)
Pasricha, C. L., de Monte, A. J. & Gupta, S. K., 315 *ter* (Misc.), 381, 684 *bis* (Chl.)
Pasteur, F., with Phisalix, 854 (Z.)
Paterson, A. S., 62 (Hel.)
Paterson, J. C., 768 (Hel.)
van Patot, P. N. T., 808 (Misc.)
Patto, O., 596 (Rab.)
Pavy, A. B., 91 (Bb.)
Pawan, J. L., with Hurst, 187, 595 (Rab.)
Pawlowsky, E., 109 (K.A.)
Pawlowsky, E. N. & Stein, A. K., 156 (Z.)
Payne, G. C. & Payne, F. K., 64 (Hel.)
Peak, I. F., 517 (Misc.)
Pecori, G., (795) (Fev.)
—— & Escalar, G., (364), (721) (Mal.)
Pédat, with Vigne, (271) (Lep.)

Peel, E., with Bourguignon, (362) (Mal.)
Peirier, 266 *ter*, 547 (Lep.)
Peña Chavarría, A., Serpa, R. & Bevier, G., 202 (Y.F.)
Penington, R. G., (260) (Am.)
Penso, G., 307 (Misc.), 765 (Hel.), 819 (Z.)
Perekropoff, G. I. & Stepanoff, P. I., 484 (Z.)
Perepérez, F. & Palau, 738 (Hel.)
Pergher, J., 735 (Hel.)
Perkins, W. H., 61 (Hel.)
Peruzzi, M., 258 (Dys.), 308 (Misc.), (260) (Am.)
Peter, F. M., 705 (Mal.)
Peters, R. A., with Jansen, Kinnersley & Reader, 92 (Bb.)
Petitdidier, with Velu & Eyraud, 504 (K.A.)
Petresco, with Labbé, Boulin & Besançon, 328 (Myc.)
Petridis, P., (260) (Am.)
Petrovych, A., 72 (Hel.)
Petrowych, A., 307 (Misc.)
Pettit, A. & Aguessy, C. D., 576 (Y.F.)
—— & Stefanopoulo, G., (203), (579) (Y.F.)
Petzetakis, 794 (Fev.)
Petzetakis, M., 566 (Lept.)
—— & Kyriazides, K., (568) (Lept.)
Pezzi, G., 272 (Der.)
Philip, C. B., 134, 135, 156 (Z.)
——, with Davis, 132 (Z.)
Phisalix, 854 (Z.)
—— & Pasteur, F., 854 (Z.)
Photakis, B., with Caminopetros & Phylactos, 727 (C.Bu.)
Phylactos, A., with Caminopetros & Photakis, 727 (C.Bu.)
Picon, R. R., 128 (Z.)
Piebenga, P. J., 710 (Mal.)
Pieraerts, G., 454 *bis* (Fev.)
Pieri, G., (772) (Hel.)
Pijper, A. & Dau, H., 452, 779 (Fev.)
——, with Goldberg, 275 (Der.)
——, with Troup, 452 (Fev.)
Pillai, A. K., with Nayar, 857 (Oph.)
Pillai, M. J. S. & Murthi, K. N., 8 (Sp.)
Pillat, A., 434 (Oph.)
Pilot, I. & Levin, I. M., 50 (Hel.)
Pinelli, A., (507) (K.A.)
Pinkerton, H. & Maxcy, K. F., 17 (Fev.)
Pinoy, E. P. & Fabiani, G., 851 (Lep.)
Pinto, C. & di Primio, R., 156 (Z.)
Pinto, G. de S., 143 (Z.)
Piquet, L., 671 (Pl.)
Pirami, E., 351 (Mal.)
—— & Tassi, G., (364) (Mal.)
Pirot, with Plazy, Marcandier & Germain, 21 (Fev.)
Pirot, R., 404 (Hel.)
——, with Marcandier, 450, 777 (Fev.), 487 (Z.)
——, with ——, Plazy & Le Chuiton, 20 (Fev.)
Pitot, (397) (Misc.)
Pittaluga, G. & Goyanes, J., (433) (Hel.)
Placidi, T., 611 (Bb.), 801 (Misc.)
Plantilla, F. C., with Rodriguez, 268 (Lep.)
Plantureux, E., 195, 607, (608) (Rab.)
Platonow, N. W. & Frolowa, W. T., 738 (Hel.)
Plazy, with Dargein, (259) (Am.)
—— & Germain, 792 (Fev.)
——, —— & Marcandier, 115 (K.A.)
——, Marcandier, Germain & Pirot, 21 (Fev.)
——, with ——, Le Chuiton & Pirot, 20 (Fev.)
Plazy, L., —— & Plazy, M., 792 (Fev.)
Plotz, M., 414 (Hel.)
Pluchon, with Millous & Raboisson, 573 (Y.F.)
Podyapolskaya, W. P., with Scriabine & Schoulz, 48 (Hel.)
Poindexter, H. A., 816 (Z.)
——, with Linton, 298 (S.S.)
Poma, C. S., (120) (K.A.)
Pomeroy, A. W. J., 474 (Z.)
Pons, J. A., 527 (Misc.)
——, with Ashford, 462 (Sp.)
——, with Del Toro & Rodriguez Molina, 78 (Hel.)
Pons, R., 678 *bis* (Pl.)
—— & Durieux, C., 678 (Pl.)
Ponto, S. A. S., with Krijgsman, 489 (Z.)
Porter, F. E., 801 (Misc.)
Portugal, H., with Rabello, 268 (Lep.)
Posselt, A., (772) (Hel.)
Postmus, S. & Schultsz, T. W., 568 (Lept.)
Potapenko, N. A. & Goutséwitch, A. W., 55 (Hel.)
Pottier, R., 848 (Lep.)
Pouchet, 39 (Hel.)
Pozzi, A., (364) (Mal.)
Pradal & Souchard, 485 (Z.)
Prade, J. V., with Des Essarts, 456 (Fev.)
Prado, A., with Monteiro & da Fonseca, 448 (Fev.)
Priest, B. V., with Nuzum & Elliot, 125 (Z.)
Priest, R. C., (364) (Mal.)
Prieur, M., with Launoy & Nicolle, 644 (S.S.)
Prigge, R., with Kolle & Rothermundt, 209 (R.F.)
di Primio, R., with Pinto, 156 (Z.)
Pruthi, H. S., 143 (Z.)
Public Health Reports, 203, (203) (Y.F.)
Punsalang, J. V., with Lopez Rizal & Sian, 680 (Chl.)
Puntoni, V. & Pampana, E. J., 860 (Der.)
Purcell, F. M., 752 (Hel.)
Purchase, H. S., with Taylor, 61 (Hel.)
Puri, I. M., 166, 167 (B.R.)
——, with Christophers, 137, (163) (Z.)

Q

Quaife, W. T., 317 (Misc.)
Quastel, J. H., 295 (S.S.)
Quenardel, 379 (Chl.)
Quérangal des Essarts, J., (260) (Am.)
Quintana, H., with Mazza & De los Rios, (278) (Der.)
——, with ——, Niño & Bernasconi, (330) (Myc.)

R

Rabello, Jr., 546 (Lep.)
—— & Portugal, H., 268 (Lep.)
Raboisson, with Millous & Pluchon, 573 (Y.F.)

Radsivilovskij, G. L., with Chodukin, Sofieff & Schevtschenko, 116 (K.A.)
Radsma, W., 235 *bis* (Misc.)
Ragab, A., with Biggam, (259) (Am.)
——, with —— & Halawani, 256 (Am.)
Ragiot, with Lavau, Souchard, Farinaud & Lieou, 205 (Lept.)
Rahoerson, R., with Hérivaux, 259 (Dys.)
Ramanujayya, R., 3 (Sp.)
Ramsay, G. W. St. C., 722 (Y. & S.)
Rao, B. A., with Sweet, 478 (Z.)
Rao, D. K., with Dikshit, 501 (K.A.)
Rao, G. R., 849 (Lep.)
—— & Roy, A. T., 553 (Lep.)
Rao, M. G. R., 85 (Hel.)
Rao, R. S., with Pandit, 683 *bis* (Chl.)
Rao, S. R., with Walker & Chenoy, 486 (Z.)
Rao, S. S. & Iyengar, M. O. T., 426 (Hel.)
Rasmeritza, E., 687 (Mal.)
Ratcliffe, H. L., 124 (Z.), 257 (Am.)
Ravaut, P., with Levaditi, Lépine & Cachera, 392 (C.Bu.)
——, with ——, —— & Schoen, 391, 392 (C.Bu.)
——, with —— & Schoen, 726 *bis*, 727 (C.Bu.)
Raybaud, A., 372 (Pl.)
——, with Arnaud, 372 (Pl.)
—— & Guglielmi, F., 372 (Pl.)
de Raymond, A., 266 *ter* (Lep.), 666 (Bl.), 682 (Chl.)
Raynal, 810 (Misc.)
Raynal, J., 430 (Hel.), 445 (Fev.), 690 (Mal.)
Read, B. E., 406 (Hel.)
Reader, V., with Jansen, Kinnersley & Peters, 92 (Bb.)
Rebagliati, R., (364) (Mal.)
Redmond, J. J., 799 (H.S.)
Redslob, E., 436 (Oph.)
Reed, A. C., 232 (Misc.)
——, Anderson, H. H., David, N. A. & Leake, C. D., 583 (Am.)
——, with Anderson, (259) (Am.)
Regendanz, P., 455 (Fev.)
——, with v. Brand, 299 (S.S.)
—— & Reichenow, E., 161 (Z.)
Reichenow, E., 121 (Z.)
——, with Regendanz, 161 (Z.)
Reimann, H. A. & Kurotchkin, T. J., 327, 328 (Myc.)
Reiner, L. & Leonard, C. S., 646 *bis* (S.S.)
Reiss, F., with Freund, 390 (C.Bu.)
Reitano, U. & Boncinelli, U., (795) (Fev.)
Remlinger, P., 597 (Rab.)
—— & Bailly, J., 189, 193, 194, 596, 597, 599, 607 *ter* (Rab.)
——, Manouélian & Bailly, 605 (Rab.)
——, Palmowitch, S. & Bailly, J., 189, 190, 192 *bis* (Rab.)
Reynolds, F. H., (669) (Bl.)
Reynolds, F. H. K., with Simmons, St. John & Holt, 13 (Fev.)
Reyntjens, P., 686 (Mal.)
Rho, F., 579 (Y.F.)
Rice, J. B., with Barber & Brown, 686 (Mal.)
Richet, C., Jr & Dublineau, J., 645 (S.S.)
Richmond, A. E., 334 (Mal.)
Richter, C. S., with Aalsmeer, 92 (Bb.)
Ricou, 525 (Misc.)
Ricou & Tran-van-Tam, 683 (Chl.)
Ridout, G. B., with Thomas, 350 (Mal.)
Riker, A. D., with Weller, 328 (Myc.)
Riou, M., with Toullec, 46, 412 (Hel.)
Rivnay, E., 488 (Z.)
Rizzo, A., 874 (K.A.)
Robbins, B. H., with Lamson, Brown & Ward, 56 (Hel.)
Roberts, J. I., with Symes, 837 (Z.)
Robic, J., with Girard & Hérivaux, 839 (Z.)
Robineau, 262 (Lep.)
——, with Sorel, 280 (S.S.)
da Rocha Lima, H., (469) (B.R.)
Rockefeller Foundation, 246 (B.R.)
de Roda, A. P., with Oliver & de Leon, 550 (Lep.)
Rodenwaldt, E., with Swellengrebel, 468 (B.R.)
Rodhain, J., 428 (Hel.)
—— & Dubois, A., 83, 428 (Hel.)
Rodriguez, J., 540, 543 (Lep.)
—— & Plantilla, F. C., 268 (Lep.)
Rodriguez-Molina, R., with Bachman, 761 (Hel.)
——, with Del Toro & Pons, 78 (Hel.)
——, with Stumberg, 68 (Hel.)
Roger, H., (271) (Lep.)
Rogers, L., 536 (Misc.)
—— & Cooke, W. E., 465 (Sp.)
Rohlfing, E. H., with Tsuchiya, 747 (Hel.)
Rojas, L., 600 (Rab.)
Romanowa, K., with Roskin, 353 (Mal.)
Romiti, C., 80 (Hel.)
Ronnefeldt, F., 518 (Misc.)
Roques, 437 (Oph.)
Roques, P., 857 (Oph.)
Rosa, A., with Arias Aranda, 117 (K.A.)
da Rosa, A. F., with da Fonseca, 324 (Myc.)
Rosedale, J. L. & Oliveiro, C. J., (618) (Bb.)
Rosenfeld, H., 390 (C.Bu.)
——, with Löhe, 730 (C.Bu.)
Roskin, G. & Romanowa, K., 353 (Mal.)
Rosner, S., 276 (Der.)
Ross, G. R., 589 (Bl.)
Ross, H., with Wooley, 552 (Lep.)
Ross, R., 238 (Misc.)
Rothermundt, M., with Kolle & Prigge, 209 (R.F.)
Roton & Mesnard, 116 (K.A.)
Rotter, W., 65 (Hel.)
Roubaud, E., 140, 141, 154 *bis*, 831 *bis* (Z.)
—— & Colas-Belcour, J., 489, 835 *bis* (Z.)
—— & Gaschen, H., 141, 828 (Z.)
——, with Magrou, J. & Magrou, M., 134 (Z.)
Rousset, J., with Garin & Gonthier, 39, 756 (Hel.)
Routledge, W. U. & Kelly, R., (625) (Pel.)
Row, R., 113 (K.A.)
Roy, A., 546 (Lep.)
Roy, A. C., with Boyd & Napier, 312 (Misc.)
Roy, A. T., with Rao, 553 (Lep.)
Roy, D. N., 481 *ter* (Z.)
——, with Strickland, 710 (Mal.)
Royal Coll. Phys. London, Cttee. on Nomenclature of Diseases 594 (B.R.)
Rubinstein, P. L. & Kapusto, M. L., 210 (R.F.)
——, with Kritschewski, 211 (R.F.)

Ruge, R., 231, 516 (Misc.), 273 (Der.), 697 (Mal.)
Ruggero & Santillana, 500 (K.A.)
Rule, A. M., with Kolmer, 645 (S.S.)
Rumreich, A., with Ceder, Dyer & Badger, 447 (Fev.)
——, with Dyer & Badger, 444 (Fev.)
——, with ——, Ceder & Badger, 16, 446 (Fev.)
——, with ——, ——, Lillie & Badger, 446 (Fev.)
——, with ——, ——, Workman & Badger, 447 (Fev.)
——, with ——, Workman & Badger, 777 (Fev.)
——, with ——, ——, Ceder & Badger, 777 (Fev.)
Russell, A. J. H., 685 (Chl.)
Russell, F. F., 575 (Y.F.)
Russell, H., with Taylor, 667 (Bl.)
Russell, H. M., (565) (R.F.)
Russell, P. F., 140, 479, 834 (Z.), 353, 691 (Mal.)
——, with Holt, 341 (Mal.)
Russell, W. K., 734 (B.R.)
Rutledge, W. U. & Kelly, R., (625) (Pel.)

S

Sabatucci, M., with Alessandrini & Pampana, 398 (B.R.)
Sabinin, A., with Bokalo, Wedischtschew, Jegorow & Grikurow, 679 (Pl.)
Sabry, I., 97 *ter* (Pel.)
Saha, B., 111 (K.A.)
St. John, J. H., 714 (Mal.)
—— & Holt, R. L., 441 (Fev.)
——, with Simmons, Holt & Reynolds, 13 (Fev.)
Saisawa, K., 569 (R.B.F.)
Sala Ginabreda, J. M., 498 (K.A.)
Salaün, G., with Vaucel, 288 (S.S.), 536 (Misc.)
——, with —— & Boisseau, 597 (Rab.)
Salem, H. H. (494) (Z.)
Salem, L., with Schneider, 598 (Rab.)
Salle, A. J., 502, 503 (K.A.)
Sambon, M., 720 (Mal.)
—— & Estas, P., 537 (Misc.)
——, with ——, (244) (Misc.), (363 *bis*) (Mal.)
Sampson, B. F., 663 (Bl.)
Samson, J. G., with Cruz & Abuel, 549 (Lep.)
Samuels, W. F., 336 (Mal.)
Sanders, J. P., 352 (Mal.)
Sanderson, G. M., 468 (B.R.)
Sandground, G. J. H., 736 (Hel.)
Sandground, J. H., 69 (Hel.)
Sanfilippo, E., 101 (Und.)
Sanjurjo, D. & Sanjurjo, M., 553 (Lep.)
Sanjurjo, M., with Sanjurjo, 553 (Lep.)
Santillana, with Ruggero, 500 (K.A.)
Santillana, A., with Uzan, 870 (K.A.)
Santonastaso, A., 856 (Oph.)
Santos Zetina, F., 506 (K.A.), (538) (Misc.)
Sarathy, M. K. P., 687 (Mal.)
——, with Iyengar, 823 (Z.)
Sardjito, (205) (Lept.)
Sardjito, M., with Mulder & Bonne, 204 (Lept.)
—— & Sitanala, J. B., 848 (Lep.)
Sargent, W. S., 93 (Bb.)
Sarkar, S. L., (93) (Bb.)
Sathe, R. G., with Naidu, 675 *bis* (Pl.)
Sato, K., 780 (Fev.)
——, with Nagayo, Miyagawa, Mitamura, Tamiya & Hazato, 784 (Fev.)
——, with ——, ——, ——, ——, —— & Imamura, 25 (Fev.)
——, with ——, Tamiya & Mitamura, 25 (Fev.)
Sato, S. & Kodama, T., 602 (Rab.)
——, with Ota, 268, 551 (Lep.)
Saunders, G., 626 *bis*, 640 (S.S.)
—— & Morris, K. S., (659) (S.S.)
Saunders, G. F. T., 282 (S.S.)
—— & Morris, K. R. S., 627 (S.S.)
Saunie, L., with Chaillot, 119 (K.A.)
Sautet, J., with Coulon, (362), (720) (Mal.), 490 (Z.)
Sawitzky, N. N., 33 (Hel.)
Sawyer, W. A., 574, 579 *bis* (Y.F.)
—— & Frobisher, M., Jr., (579) (Y.F.)
——, Kitchen, S. F. & Lloyd, W., 572 (Y.F.)
—— & Lloyd, W., 198 (Y.F.)
Scaturro, A., (507), 873 (K.A.)
Schachsuwarly, M., 667 (Bl.), (721) (Mal.)
Schapiro, L. & Nauck, E. G., 419 (Hel.)
Scharff, J. W., 335 (Mal.), 826 (Z.)
Scheff, G., 651 (S.S.)
Schevtschenko, F. J., (164) (Z.)
——, with Chodukin, Sofieff & Radsivilovskij, 116 (K.A.)
Schilling, C. & Borghi, B., 300 (S.S.)
—— & Neumann, H., 649 (S.S.)
—— & Schreck, H., 816 (Z.)
Schilling, V., 527 (Misc.)
Schlossberger, H., with Fischl, 733 (B.R.)
—— & Menk, W., 812 (Misc.), 854 (Z.)
Schmelewa, A. A., 415 (Hel.)
Schmidt, A., 764 (Hel.)
Schmidt-La Baume, with Fischer, 729 (C.Bu.)
Schneider, J. E. & Salem, L., 598 (Rab.)
Schnitzer, R., 650 (S.S.)
Schöbl, O., 386 *quat* (Y. & S.)
—— & Hasselmann, C. M., 723 (Y. & S.)
Schockaert, J., (570) (R.B.F.)
Schoen, R., with Levaditi & Ravaut, 726 *bis*, 727 (C.Bu.)
——, with ——, —— & Lépine, 391, 392 (C.Bu.)
Schoening, H. W., 195 (Rab.)
Schönhöfer, F., with Schulemann & Wingler, 353 (Mal.)
Schoulz, G. S., with Scriabine & Podyapolskaya, 48 (Hel.)
Schoute, E., with de Buck & Swellengrebel, 345 (Mal.)
Schreck, H., with Schilling, 816 (Z.)
Schuchat, J. A., 426 (Hel.)
Schüffner, W., 568, (569) (Lept.), 578 (Y.F.), 342 (Mal.)
——, with Snijders & Dinger, 12 *bis* (Fev.)
Schueffner, W. A. P., with Dinger & Snijders, (203) (Y.F.)
——, Swellengrebel, N. H., Annecke, S. & de Meillon, B., 693 (Mal.)

Schujman, S., with Carrillo & Fernández, 264 (Lep.)
Schulemann, W., 704 (Mal.)
——, Schönhöfer, F. & Wingler, A., 353 (Mal.)
Schultsz, T. W., with Hoffmann, 503 (K.A.)
——, with Postmus, 568 (Lept.)
Schut, J., 374 (Pl.)
Schütze, H., 676 (Pl.)
Schuurman, C. J. & Huinink, A. M. S. B., 152 (Z.)
Schwarz, A., 150 (Z.)
Schwarzmann, B. E., 874 (K.A.)
Schweinburg, F., 601 (Rab.)
Schwetz, J., (164) (Z.)
Scott, A. V., 869 *bis* (K.A.)
Scriabine, K. I., Podyapolskaya, W. P. & Schoulz, G. S., 48 (Hel.)
Seal, S. C., 853 (Z.)
Sedat, H., 464 (Sp.)
Sellards, A. W., 198, 575 (Y.F.)
—— & Laigret, J., 572 (Y.F.)
Selwyn-Clarke, P. S., (364) (Mal.)
Sembon, S., 172 (Z.)
Sen, N. K., 501 (K.A.)
Senevet, A., with Sergent, Edm., Sergent, Et., Parrot, Foley & Catanei, 322 (Mal.)
Senevet, G., 132 *bis* (Z.), 316 (Misc.), 703 (Mal.)
Senior-White, R., (164) (Z.)
Senn, E., 167 (B.R.)
Sequeira, J. H., (538), 809 (Misc.)
Serebrennaja, A. I., with Palawandow, 191 *bis* (Rab.)
Sergent, Ed., 181 *bis* (Lab.)
—— & Sergent, Et., 248, 881 (B.R.)
——, ——, Parrot, L., Foley, H., Catanei, A. & Senevet, A., 332 (Mal.)
Sergent, Et., 686 (Mal.)
——, with Sergent, Edm., 248, 881 (B.R.)
——, with ——, Parrot, Foley, Catanei & Senevet, 332 (Mal.)
Serpa, R., with Peña Chavarría & Bevier, 202 (Y.F.)
Serra, A., 314 (Misc.)
Serra, V., (364) (Mal.)
Sévin, A., with Buttiaux, 243 (Misc.)
Seyfarth, E., with Strümpell, 594 (B.R.)
Sézary, A., with Vaudremer & Brun, 550 (Lep.)
Shanks, G. & De, M. N., 113 (K.A.), 616 (Bb.)
Shannon, R. C., 131, 135, 834 (Z.)
——, with Davis, 197 (Y.F.)
—— & Frobisher, M., Jr., (164) (Z.)
——, with ——, 396 (Misc.)
——, with ——, & Davis, 196 (Y.F.)
Shattuck, G. C. & Hilferty, M. M., 798 (H.S.)
Shaw, F. W., 327 (Myc.)
Shelmire, B. & Dove, W. E., 157 (Z.)
——, with ——, 450, 778 (Fev.)
Sherwani, A. H. K., 432 (Hel.)
Shibata, T., with Kawamura & Imagawa, 788 (Fev.)
Shillong, 519 (Misc.)
Shope, R. E., 189 (Rab.)
Shorb, D. A., 71 (Hel.)
Shortt, H. E., 144 (Z.)
Shortt, H. E., *et al.*, 864 (K.A.)
——, Campbell, H. G. M. & Lal, C., 865 (K.A.)
Shortt, H. E., Smith, R. O. A. & Swaminath, C. S., 107, 865, 866, 867, 868 (K.A.)
——, ——, —— & Krishnan, K. V., 107 (K.A.)
—— & Swaminath, C. S., 471 (Z.), 871 (K.A.)
Shousha, A. T., 379 (Chl.)
Shrivastava, D. L., with Hughes, 348 (Mal.)
Shropshire, J. B., 139 (Z.)
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